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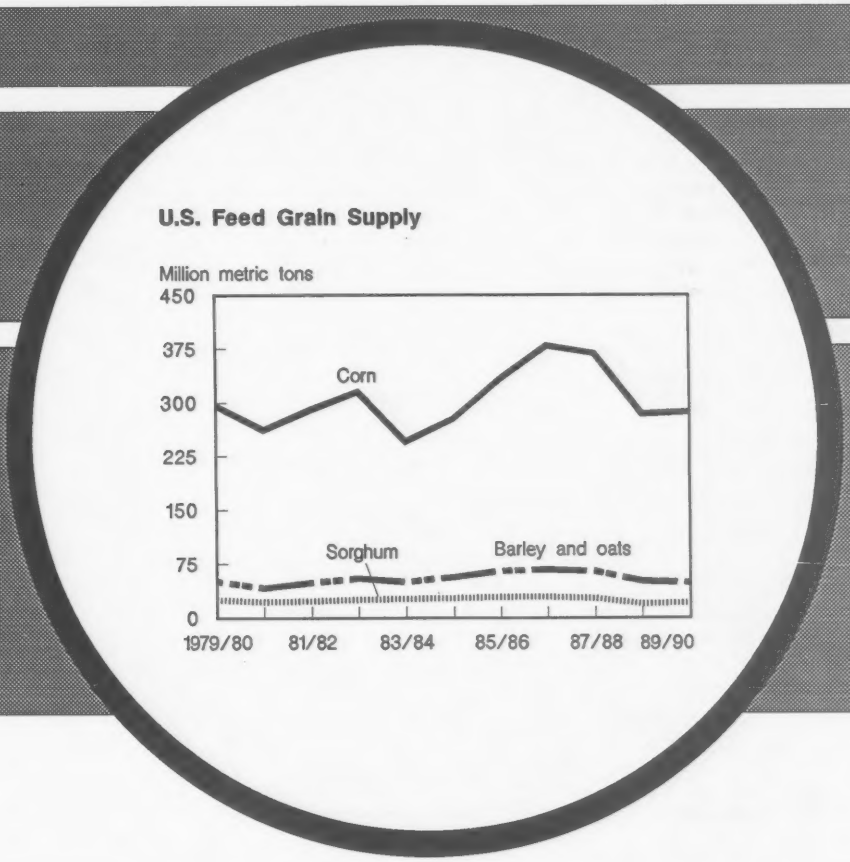
Situation and Outlook Report



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Summary

The feed grain supply for 1989/90 is forecast at 290 million metric tons, 2 percent larger than last year. Beginning stocks were less than 50 percent of a year earlier, but a sharp rebound in yields and 10.3 million more acres harvested for grain increased this year's production by 49 percent, more than offsetting the decline in stocks.

Disappearance for 1989/90 is forecast at 229 million tons, up almost 5 percent from last year. Domestic use is forecast at 166.2 million tons and exports at 62.8 million, up 6 percent and 1 percent.

With use exceeding production, ending stocks are forecast to drop nearly 5 million tons, the third consecutive decline. However, feed grain prices likely will average about 7-22 percent lower in 1989/90 than in the drought year of 1988/89.

The corn supply for 1989/90 is forecast at 9.5 billion bushels, 4 percent larger than last year. Beginning stocks were 1.9 billion bushels, down 55 percent from a year earlier, but production as of November 1 was forecast at 7.6 million bushels, up 55 percent. Use is expected to slightly exceed 7.6 billion bushels, 5 percent above last year. FSI use is forecast at 1.28 billion bushels and exports at 2.15 billion, up 2 percent and 4 percent, respectively. Feed and residual disappearance is forecast at 4.2 billion bushels, up 6 percent. The season average farm price is expected to fall to $2.00-$2.40 a bushel, compared with last year's $2.54.

The sorghum supply for 1989/90 is forecast at 1.07 billion bushels, down 14 percent from last year. Carryin stocks were down a third, and production is up only 9 percent from the 1988 crop. The area harvested this year increased 1.4 million acres, but the yield was 4 bushels lower. Domestic use is expected to rise slightly, while exports drop about 20 percent. However, feed and residual use is expected to rise 6 percent to 500 million bushels. The season average farm price, largely influenced by corn prices, is forecast to range from $1.85 to $2.25 per bushel.

The barley supply, at 616 million bushels, is 2 percent below a year earlier as a sharp rebound in production largely offset smaller carryin stocks. A rise of 10.4 bushels in the indicated yield per acre and an 8-percent gain in harvested area led to a 38-percent gain in production. Use for 1989/90 is forecast up 25 million bushels on strength of larger domestic use. Ending stocks are forecast down 18 percent from last year. The season average price is expected to be $2.35-$2.55 a bushel, compared with last year's $2.79.

The 1989/90 oat supply is forecast up 125 million bushels from a year earlier as production gains offset lower beginning stocks and lower imports. Use is forecast at 412 million bushels, up more than a third from last year. FSI use is forecast up 10 percent, while feed and residual disappearance may be 50 percent above 1988/89. The season average price is forecast to be $1.40-$1.60 a bushel, down substantially from last year's $2.61.

The hay supply for 1989/90 is 168.1 million tons, up from last year's drought-reduced 154.2 million tons. Production this year was 150.5 million tons, up 18 percent, even though area harvested was down 4 percent. Yields, at 2.4 tons per acre, rebounded 24 percent. Hay prices were high early in the crop year but with larger production, have dropped to slightly below a year earlier. Prices are not expected to rise as much between now and next April as last year, which would make the average price near 1988/89's $87.10.

Feed and residual disappearance in 1989/90 is forecast at 127.9 million tons, up almost 8 percent. The reduced feed grain production in 1988/89 tended to boost prices and lower feed and residual use. Feed and residual use typically rebound after a short crop.

FSI use of corn in 1989/90 may represent slightly below 17 percent of corn use, about the same as in 1988/89. Corn used by the wet milling industry is expected to rise about 4 percent from a year earlier. Corn used by the dry milling industry may increase about 2 percent, as some alcohol plants now closed are reopened to use lower cost corn.

Transportation facilities are being stressed by heavy export demand in November and December, while lower water levels and temporary damage to a lock and dam are limiting the Mississippi's carrying capacity. Peak demand in these months will increase average transport costs as barge rates remain high and some grains are diverted from barge to rail.

Global coarse grain production in 1989/90 is projected to rise 11 percent to 808 million tons, with the United States providing most of the increase. Foreign production is forecast up 1 percent. Global consumption is projected to rise 3 percent with foreign gains accounting for more than 50 percent of the increase. World ending stocks are projected to decline nearly 12 million tons, the third straight drop.

World coarse grain trade is projected to rise 5 percent in 1989/90, the second consecutive year of significant growth, largely due to continued strong import demand by the Soviet Union. U.S. coarse grain exports are projected up 4 percent, as corn and barley exports rise. Competitor coarse grain exports are projected to rise a little, likely causing the U.S. market share to slip slightly. All of the competitor export gains are expected in corn, with small declines likely for barley and sorghum.

Feed Grain Supply And Use

The feed grain supply for 1989/90 is forecast at 290.0 million metric tons, up 2 percent from last year's 284.3 million. Last year, large beginning stocks cushioned the 31-percent drop in production resulting from a severe drought over the Corn Belt, Northern Plains, and the Lake States. This year, carryin stocks are only 49 percent of last year's level, but improved yields and 10.3 million more acres harvested for grain increased production 49 percent, or more than enough to offset the decline in stocks.

In addition to feed grains, the supply of concentrates for livestock and poultry will be augmented by an additional 17.4 million tons of other energy feeds and about 37.9 million tons of high-protein feeds. Thus, the total supply of concentrates for 1989/90 is forecast at 345.3 million tons, up 2.6 percent from the 1988/89 supply of 336.7 million tons. The supply is a measure of what is forecast to be available in the market but actual use for feeding will depend not only on the demand from the livestock and poultry industries but also the demands from the domestic food and industrial processing industry and from users abroad.

Total feed grain use this year is forecast at 229 million tons, up almost 5 percent from last year. FSI use is forecast at 38.3 million tons, 2 percent above last year. Exports are forecast at 62.8 million tons, up 1 percent from 1988/89. Feed and residual use is forecast at 127.9 million tons, up almost 8 percent.

With forecast use up almost 11 million tons in 1989/90, and supply up less than 6 million, ending stocks are expected to drop almost 5 million from the 65.9-million-ton carryin. This would be the third consecutive year of stock reduction, and 1989/90 carryout would be the lowest since 1984/85. Stocks in the Commodity Credit Corporation (CCC) and the farmer-owned reserve (FOR) are estimated at 29.7 million tons at the end of 1989/90, the smallest since 1983/84.

Feed grain prices, weighted by use, likely will average about 7-22 percent lower this year than in 1988/89. The weighted average price received by farmers for feed grains in 1988/89 was almost $102 per metric ton. If unfavorable weather prevails next spring and summer, prices would average closer to last year, but if normal growing weather prevails, and if some combination of larger supply and lower use develops, the decline in average price would be nearer 22 percent.

Corn

September 1 Stocks at 1,930 Bushels

Ending stocks for the 1988/89 crop year were reported at 1,930.4 million bushels by the National Agricultural Statistics Service (NASS). The June-August corn supply was 3,420.2 million bushels, so disappearance for the quarter

Table 1--Corn supply, disappearance, and stocks, Jun.-Aug.

Item	1987/88	1988/89
	Million bushels	
Supply:		
Begin. stocks, June 1	5,835.5	3,419.3
CCC	1,304.9	417.7
FOR	1,447.5	945.6
Loan	2,062.6	811.7
Uncommitted	1,020.5	1,244.3
Imports (Jun.-Aug.)	0.9	0.9
Total Supply	5,836.4	3,420.2
Use:		
Food, seed, & industrial	323.5	336.0
Exports	414.4	469.8
Feed and residual	838.9	684.0
Total	1,576.8	1,489.8
Stocks Sept. 1:		
CCC	835.0	362.5
FOR	1,126.8	635.5
Loan	928.6	185.3
Uncommitted	1,369.2	747.1
Total	4,259.6	1,930.4

amounted to 1,489.8 million bushels, down nearly 5 percent from a year earlier. However, FSI use of 328 million bushels, and exports of 470 bushels, were up 4 percent and 13 percent, respectively. A decrease in feed and residual disappearance of 18 percent more than offset the gains in FSI and exports.

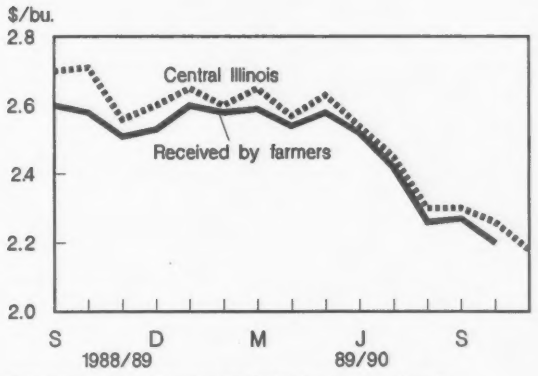
Disappearance for the 1988/89 crop year totaled nearly 7.26 billion bushels, 6 percent less than a year earlier. Exports totaled 2.06 billion bushels, up almost 19 percent from year-earlier shipments and the largest since 1980/81. FSI use rose 1.7 percent from 1987/88 to almost 1.25 billion bushels in 1988/89. A mild summer resulted in a less than normal seasonal gain in soft drink sales and relatively little growth in high fructose production.

Feed and residual disappearance, as appears to be the case in each drought year, declined from 4.74 billion bushels in 1987/88 to 3.95 billion in 1988/89, even though grain-consuming animal units (GCAU's) were up 1 percent in 1987/88 to 76.5 million last year. The residual in the feed and residual disappearance must have been significantly below the norm. On the other hand, the residual in 1986/87 and 1987/88 likely was above the norm when feed and residual disappearance was high relative to livestock and poultry numbers.

Ending Stocks Down 55 Percent

Stocks of corn on-farm and off-farm totaled 1,930 million bushels on September 1, 1989, 55 percent below a year earlier and the lowest ending stocks since 1984/85. On-farm stocks were 967 million bushels and off-farm stocks were 963 million, of which 362.5 million were held by the CCC. Farmer-owned reserve stocks amounted to 724.6 million bushels, which were mostly in on-farm storage. Regular loans of 336.7 million bushels were outstanding, also mostly in on-farm stocks.

Figure 1
Monthly Average Corn Prices



October farm price and November Central Illinois price are mid-month.

The ending stocks-to-use ratio was 26.6 (1,930/7,255). Under normal conditions, the average price received by farmers would have been lower than the reported $2.54 for 1988/89. However, two factors significantly influenced farmers' willingness to sell this past year. First, the 1988 crop was reduced by drought and farmers are less willing to sell in drought years. Second, about the end of winter a rise in supply and drop in use indicated that ending stocks were not going to be tight, but in the spring and early summer, low subsoil moisture and weather conditions led to fears that this year's crop would also be drastically reduced. This perpetuated the bullish views of farmers and held prices relatively steady until July and August when the threat of a serious reduction in this year's crop began to abate.

Supply Up 4 Percent for 1989/90

As of November 1, NASS estimated the 1989 corn crop at nearly 7.6 billion bushels from a yield of 116.6 bushels per acre on 65.1 million acres harvested. This year's yield is 37.8 percent above last year's drought-reduced yield of 84.6 bushels per acre. In 1984, also the first year after a major drought, yield recovered 31.6 percent from 81.1 in 1983 to 106.7 in 1984. The greater percentage recovery this year may mirror the upward trend that has characterized corn yields.

Adding a small amount of imports and beginning stocks of 1.9 billion bushels to this year's harvest results in a total supply of 9.5 billion bushels for 1989/90, 4 percent larger than last year. Disappearance is estimated at slightly over 7.6 billion bushels, a little more than this year's harvest, indicating a small decrease in expected ending stocks next September.

FSI is forecast to rise to 1,275 million bushels from 1,245 million used in 1988/89. Some growth in sweetener use, a normal seasonal rise in the soft drink market next summer, and a small increase in ethanol production are the factors underlying the expected increase in use.

Exports are forecast to be 2.15 billion bushels this year, up 90 million from last year and the third largest on record. Large imports by Russia is the main factor underlying the projected rise.

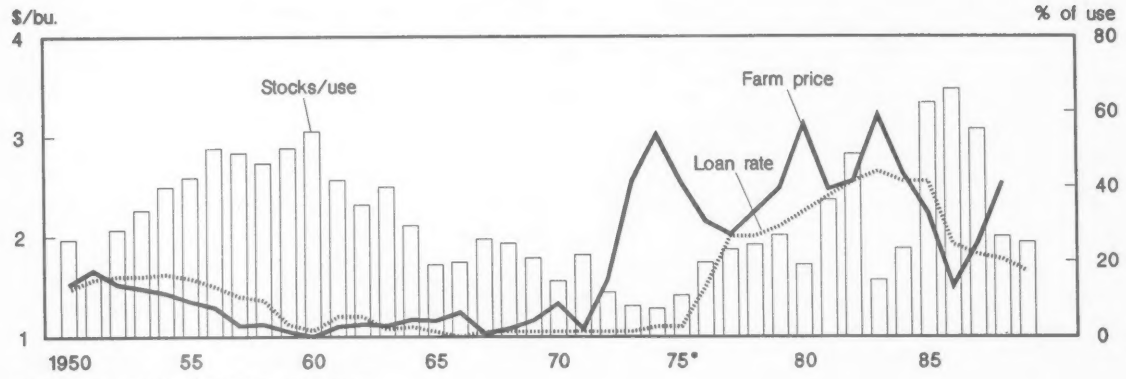
Feed and residual use is forecast to rise about 6 percent to 4.2 billion bushels, even though GCAU's are forecast to rise 1 percent to 77.3 million this year. No longer is there a statistically significant relationship between GCAU's and feed and residual disappearance. However, in each year following a drought the feed and residual disappearance recovers on an average of 260 million bushels. As in recent years, the GCAU's representing dairy and red meats will show no growth, but GCAU's for the poultry sector will rise nearly 5 percent. Thus, the protein share of total concentrates used likely will increase again in 1989/90.

Ending stocks are forecast at nearly 1.9 billion bushels, only 30 million less than for 1988/89. At the forecast use of 7.6 billion bushels, the ending stocks-to-use ratio would be 24.9, slightly less than the 1988/89 ratio of 26.6. Based on historical relationships a stocks-to-use ratio of this magnitude would imply a season weighted average price about 16 cents a bushel above the loan rate. However, the farmers' bullish market view generated during the 1988/89 crop year is carrying into the 1989/90 crop year. The corn crop was 93-percent harvested by mid-November, but farmer selling has been slow and prices have evidenced little decline during the harvest season. A number of factors may account for the slow movement of corn this fall:

- Farmers have ample on-farm storage.
- Farmers may expect prices to go higher.
- Farm income was relatively high in 1989 and farmers are delaying sales until the next tax year.
- Currently farmers are placing corn under loan with the expectation that these loans may be eligible to go into the FOR.
- Farmers may be holding corn as a hedge against a possible drought in 1990.

The season average farm price will depend on the relative strength of these factors and weather conditions next spring and early summer. If tax reasons are an important factor in the slow marketing pace this fall, sales would be expected to pick up after the first of the year and prices likely would be

Figure 2
Stocks to Use, Loan Rates, and Prices



* Ending stock data shifted from October to September.

under pressure. A second reason why sales may increase in the late winter is to generate cash flow to cover variable costs for seedbed preparation, planting, and cultivation. More cash would be raised in the market than through a CCC loan at $1.65.

If farmers are holding in expectation of higher prices, they may change their expectations in the spring if export demand weakens. Exports, plus outstanding sales for 1989/90 shipment total 938 million bushels through November 27. To meet the 1989/90 export forecast, additional sales of 1.21 billion bushels will be needed for the balance of the year, a lower weekly average rate of new sales than last year.

If weather is a major factor for farmers holding corn, the outcome likely would be evident by early summer. If rainfall and temperature permit normal planting and growth, drought fears will tend to subside and farmers likely will increase selling. Selling pressure will bear heavily on price at this time of year because market needs are declining seasonally during the summer.

The 1989 corn crop is evidence that subsoil moisture can be short and good yields still result if temperature and rainfall in June and July are normal or better. For the four droughts, 1970, 1974, 1980, and 1983, the yield was always higher the second year after the drought than the first year of recovery. After the drought of 1983, the 1985 yield exceeded the 1984 yield by 10.6 percent, and the average increase from the first to the second year of recovery for the four droughts was 6.7 percent. If this relationship holds in 1990, the yield would be 124 bushels an acre.

Since 1950, the season average farm price has held close to the loan rate except for years when ending stocks-to-use ratios were very low or the year was a drought year (fig. 2). Since 1975, when stocks-to-use ratios are calculated on a stock position of September 1 instead of October 1, the most the season average farm price exceeded the loan rate in a non-drought year, with a stocks-to-use ratio in excess of 20, was 38 cents a bushel in 1979/80, and prices in July and August of that year reflected the drought of 1980.

The season average farm price for 1989/90 is expected to average between $2.00 and $2.40 a bushel. The upper end of the range represents unfavorable weather next spring and summer and/or greater disappearance than forecast. The lower end would result from favorable growing conditions during the spring and summer and a change in supply and use expectations that would yield larger ending stocks than the current forecast.

It is too early to speculate on the 1990 crop, although a rise in corn yields appears probable. On September 29, Secretary Clayton Yeutter announced feed grain program provisions for 1990. The loan rate and target price are $1.57 and $2.75, down 8 cents and 9 cents, respectively, from 1989. The variable cost likely will rise less than in 1989 because of the large increase in the price of seed in 1989. If farmers expect normal yields, the loan rate will exceed the average variable cost per bushel for most farmers. If prices hold relatively steady through January, the incentive to participate in the program likely will be about the same as in 1989. A smaller signup for the 0-92 program, a higher proportion of the permitted acreage planted, and some switching back of soybeans planted under 10-25 options may result in plantings of approximately 75 million acres in 1990. Thus, the probability appears high of a further increase in corn production in 1990.

Sorghum

Total use for 1988/89 was 802.3 million bushels, down 17.5 million from 1987/88. Domestic use was off 96.1 million

Table 2- Sorghum supply, disappearance, and stocks, Jun.-Aug.

Item	1987/88	1988/89
	Million bushels	
Supply:		
Begin. stocks, June 1		
CCC	511.4	363.8
FOR	80.4	45.0
Loan	148.0	40.1
Total	807.8	558.5
Production:	0.0	0.0
Total supply	807.8	558.5
Use:		
Food, seed, & industrial	9.8	4.2
Exports	46.0	72.1
Feed and residual	89.3	44.2
Total	145.1	120.5
Ending stocks Sept. 1:		
CCC	463.6	340.9
FOR	69.5	23.4
Loan	51.8	10.5
Uncommitted	77.8	63.2
Total	662.7	438.0

bushels, primarily in feed and residual disappearance, and exports were up 78.6 million bushels. During September-May, use was ahead of a year earlier on much larger exports, and even though exports exceeded year-earlier shipments in June-August, a 50-percent drop in feed and residual disappearance in this quarter pulled total use down for the year. The season average farm price was $2.27 a bushel, or 89.4 percent of the season average price of corn.

Total supply for 1988/89 was 1,240 million bushels, and use of 802 million left ending stocks of 438 million bushels, 34 percent below a year earlier. As of November 1, NASS forecast this year's sorghum crop at 628.9 million bushels on a national yield of 59.8 bushels per acre from 10.5 million acres harvested. This year's crop is 9 percent larger than the 1988 crop even though area harvested was up 16 percent; yield was down 6 percent.

Adding beginning stocks of 438 million bushels to this year's production gives a total supply for 1989/90 of 1,067 million bushels, down 14 percent from 1988/89. Disappearance for 1989/90 is forecast at 765 million bushels, 37 million less than 1988/89 disappearance of 802 million. FSI use is expected to drop to 15 million bushels from 22 million last year. Exports are forecast to decline to 250 million bushels, down 19 percent from 1988/89. Partly offsetting these declines is an expected increase in feed and residual use of 30 million bushels from last year to 500 million this year.

Use in 1989/90 is forecast to exceed production by 136 million bushels, reducing expected stocks to 302 million bushels on September 1, 1990. Free stocks will be tight because about 275 million bushels of ending stocks will be in CCC inventories. However, the sorghum harvest starts in southern Texas in late June and will tend to moderate price pressures from tightening supplies of old-crop sorghum. The season average farm price is forecast to range from $1.85 to $2.25 a bushel.

The price of sorghum ran strong relative to corn during September and October. This may result from large exports and heavy buying by importers so far this year. Based on the *Export Sales* report, exports and outstanding export sales on October 26 totaled 93.4 million bushels, up almost 17 percent from a year earlier. However, unless the export forecast of 250 million bushels for 1989/90 is revised upward later in the year, buying pressure from exporters will be much less in coming months relative to a year earlier.

Barley

The 1989 barley crop is estimated at 405 million bushels, up 38 percent from the drought-reduced crop of 1988. Improved spring moisture conditions were largely responsible for the rise. The national average yield increased to 48.6 bushels per acre, compared with 38.2 for 1988, but was still below the preceding 10-year average of 50.6 bushels. Although 1989 planted acreage was below a year earlier, harvested acreage was up 8 percent to 8.3 million acres because of fewer abandoned acres.

North Dakota production in 1989 rebounded 117 percent from 1988. Montana, Minnesota, and South Dakota also benefited from better growing conditions. Assessments of crop quality indicate highly variable conditions between States, as a hot and dry summer in the Northern Plains boosted protein and lowered test weight and plumpness. Domestic supplies of malting barley should be adequate to meet current demand, but prices are expected to remain relatively strong.

Barley stocks as of September 1 were 418 million bushels, down 7 percent from the year earlier. The reduction came out of off-farm stocks, as on-farm stocks increased from 239 million bushels in 1988 to 253 million this year. North Dakota, Minnesota, and Montana held 60 percent of stocks in all positions. As of November 8, farmers have placed 16.7 million bushels of the 1989 crop under regular 9-month loans.

Feed and residual disappearance for the 1989/90 crop year is expected to be 190 million bushels, a 25-million-bushel increase from 1988/89. Food, seed, and industrial use is projected to be unchanged from last year's 180 million bushels.

Barley exports for 1989/90 are projected to be 85 million bushels, about the same as 1988/89, but still more than 40 million below 1987/88. Export commitments as of November 9 were 52.6 million bushels, versus 43.1 million a year earlier.

With higher anticipated domestic barley use and no change in exports, 1989/90 ending stocks are projected to drop to 161 million bushels, or 35 percent of forecast use. This is down from 46 percent in 1988/89 and close to the previous 40-year average stocks-to-use ratio. Assuming that maturing

FOR loans are not extended, these stocks most likely will be forfeited to CCC. Since no crops have been placed in the reserve since 1985, FOR stocks likely will be drawn down to zero. Projected 1989/90 CCC ending inventory is 40 million bushels, which would be the lowest level of Government stocks since the end of 1981/82. Free stocks are expected to be little changed from the 125 million bushels at the beginning of 1989/90.

Barley prices are expected to be lower in 1989/90. The season average price received by farmers is expected to range between $2.35 and $2.55 a bushel, versus $2.79 for the 1988 crop year. October cash prices for malting barley were still well above feed barley prices ($3.48/bu. vs. $2.16/bu.) but the spread narrowed about $1 per bushel from last fall. This remains high compared to the historical season average spread of 74 cents.

Farmers received an advance deficiency payment of 40 percent of their 1988 projected payment rate, which amounted to 30.4 cents per bushel. However, since the average market price exceeded the barley target price in 1988, farmers are obliged to refund the advance payments to the Government. Advance deficiency payments for 1989 of 11.5 cents per bushel were made last December.

USDA has announced provisions for the 1990 feed grain program. The barley target and nonrecourse loan prices will be $2.36 and $1.28, respectively. The acreage reduction program (ARP) will remain at 10 percent. As in the past, malting barley acreage will not be exempt from ARP requirements. There will be no paid land diversion. The combined barley-oats base will be split for the 1990 crop. Farmers may sign up between January 16 and April 13, 1990.

Oats

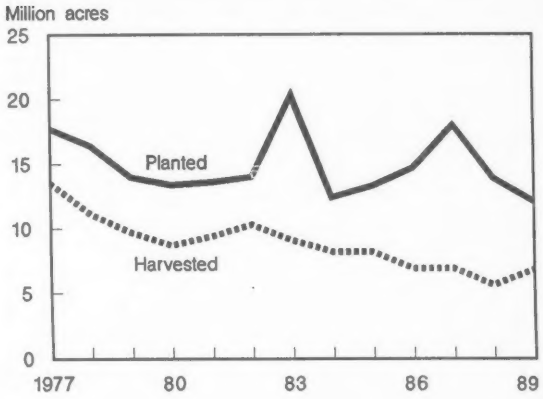
Oat supplies will be more abundant for the 1989 crop year as U.S. production has far exceeded the drought-reduced crop of 1988. Food processors will continue to expand their use of oats and feed use will rise as producer prices become more competitive with other energy feeds.

Production Regains Predrought Levels

The total supply of oats for 1989/90 is projected to be 524 million bushels, 31 percent larger than a year earlier. Oat production for 1989 is estimated at 370.7 million bushels—69 percent above 1988. Beginning stocks totaled 98 million bushels and imports are projected at 55 million bushels. However, this year's supply is still far below the 5-year average (1983/84-87/88) of 660 million bushels.

Area planted to oats in 1989 totaled 12.1 million acres, down 1.8 million from 1988. Lower cover crop needs associated with the wheat and feed grain ARP requirements are probably responsible for the drop. Acres harvested for 1989 totaled 6.8 million, 22 percent above 1988.

Figure 3
Acreage of Oats Planted and Harvested



Yields also rose to 54.3 bushels per acre, equal to the 10-year average and 39 percent above 1988. Yields were up sharply in the major producing States of Wisconsin (94 percent), Minnesota (67 percent), Iowa (50 percent), and South Dakota (60 percent).

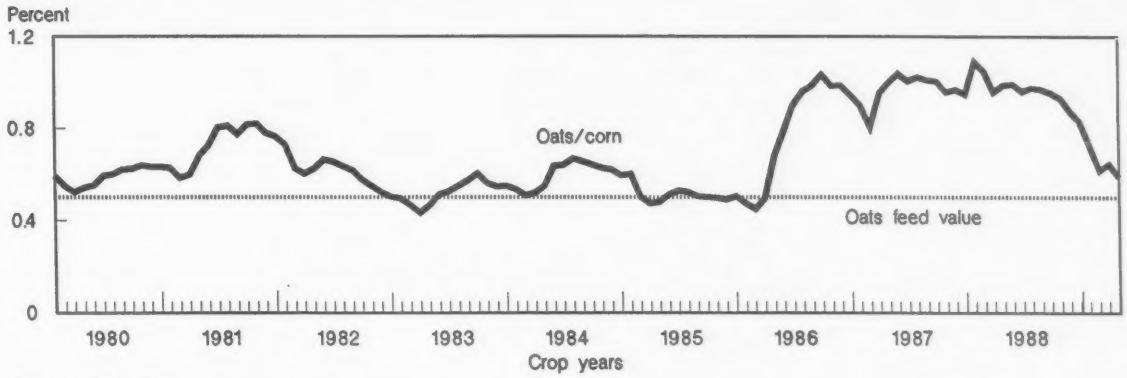
Beginning stocks on June 1 totaled 98 million bushels and consisted mostly of free stocks, with 2 million bushels owned by the CCC. As of November 8, 1.3 million bushels, or 1.5 percent of eligible production had been put under regular loan. Market prices have remained above loan rates and are responsible for the low use of price support loans.

Imports for the 1989 crop year are projected to be 55 million bushels, or 10 percent of supply. This would represent a 19-percent decline from last year's 68 million bushels. Imports for the first 3 months totaled 18.3 million bushels, compared with 12.6 million in 1988/89. The bulk of the imports are expected to originate in Canada and the Scandinavian countries. As of August, the Canadians removed the marketing of oats from the control of their Wheat Board and turned it over to private industry. This action would appear to ease the process of exporting Canadian oats.

Feed To Account For a Large Share of Increased Consumption

Total disappearance for the 1989 crop year is projected to be 412 million bushels, 37 percent above a year earlier. Most of the increase will be in feed and residual disappearance as prices drop closer to their feed value relative to corn and barley. Feed and residual use is projected to increase to 300 million bushels, compared with 200 million last year. Oats can begin to be added to selected livestock rations, in addition to

Figure 4
Oats/Corn Price Relationships



Average producer prices.

the specialty feed uses for pleasure and race horses, as its price approaches the feed value of competing energy feeds.

The FSI use is projected to rise to 110 million bushels, a 10-percent increase over 1988 chiefly due to the increased use of oats in food products. Oats food use is rising because recent studies have shown the merits of oats fiber.

Ending stocks are expected to reach 112 million bushels, up 14 percent from 1988's carryover. All of these stocks are expected to be in the free category and consequently will be immediately available to the market. Despite increased production, the stocks-to-use ratio is projected to be 27 percent, indicating a continuing tight market for oats.

Season average producer prices are expected to drop to $1.40-$1.60 per bushel, down from $2.61 reported for the 1988 marketing year. The general feed value of oats represents 51 percent of the price of corn. The projected price of oats for the 1989 crop year represents a value equal to 67-70 percent of corn, compared with last year's value of 103 percent. Producer oats prices for June-October, the first 5 months of 1989/90 marketing year, averaged $1.52, compared with $2.34 for corn, or 65 percent of corn's value.

Program Provisions for 1990

Program provisions for the 1990 feed grain crop were announced in late September. The ARP for oats will remain at 5 percent, compared with 10 percent for the other feed grains, and the 0-92 alternative will continue. Target prices are set at $1.45 and the loan rate is set at $.81 per bushel. The oats and barley base is split for the 1990 crop in an effort to increase harvested acres of oats. Oats is not subject to the limited cross compliance provision, and there will be no paid land diversion program. Oats may be substituted for any portion of the farm acreage base except for that acreage designated as soybeans. Sign-up dates for the 1990 crop are January 16 through April 13, 1990.

Hay

The hay supply for 1989/90 is 168.1 million tons, up 9 percent from last year's drought-reduced 154.2 million. Production this year was 150.5 million tons, up 18 percent from 1988/89 and back to near the tonnage of the mid-80's. However, supplies are not as high because of low carryin stocks. Acreage harvested in 1989 was down 4 percent from the 65.6 million in 1988, which included substantial acreage of set-aside and conservation reserve acres that were released for haying due to the drought. Yield per acre has also rebounded 24 percent from 1988 to 2.4 tons per acre.

Production of alfalfa, an important forage crop for the dairy industry, totaled 79.9 million tons, up from 1988's 69.3 million, even though harvested acreage was down 1.2 million acres to 25.5 million. Average U.S. alfalfa yields in 1989 were 3.13 tons per acre, up from 1988's 2.6 tons but still below 1987's 3.3 tons.

The 10 major dairy States (California, Iowa, Michigan, Minnesota, New York, Ohio, Pennsylvania, Texas, Washington, and Wisconsin), which accounted for 68 percent of U.S. milk production in 1988, harvested 39.6 million tons of alfalfa from 11.5 million acres. In 1988, these States harvested 34.8 million tons from 13.4 million acres. Production was up because of a 33-percent increase in yields. California, Iowa, Minnesota, New York, and Washington produced less alfalfa hay than last year. Iowa, New York, and Minnesota's output may have been affected by the dry spring, low yields, and a sharp drop in harvested acreage.

Production of all other types of hay totaled 70.6 million tons, up 23 percent from 1988. Acreage harvested in 1989

dropped 4 percent from 1988 when some set-aside and conservation reserve acres were released for haying. Yield per acre in 1989 was 1.9 tons, up from 1988's 1.48. In 1989, the 10 States with the largest number of beef cows that have calved (Florida, Iowa, Kansas, Kentucky, Missouri, Montana, Nebraska, Oklahoma, South Dakota, and Texas) harvested 31.5 million tons of other hay from 18.3 million acres, up from 24.2 million tons from 18.2 million acres in 1988. These States in 1989 accounted for 45 percent of the other hay crop.

Combined production of alfalfa and other types of hay in the 10 major dairy States totaled 62.2 million tons this year, compared to 52.9 million last year. For both years, the leading dairy States accounted for 41 percent of total hay production. The 10 leading States in number of beef cows accounted for 36 percent of all hay in 1989 and 35 percent in 1988.

Prices for both alfalfa and other types of hay have averaged above last year thus far in the marketing year (May-April). Prices for alfalfa hay in May-October 1989 averaged $95.18 per ton, up from $87.40 last year.

Given the general improvement in hay supply, prices are not expected to rise as they did last year through the winter and spring. Unlike last year, silage supplies in 1989/90 should be normal. Even in those areas in which corn was planted late, the corn should have adequately matured for silage. Higher prices for alfalfa hay have cut exports in 1989, with May-August 1989 exports of meal and cubes down 15 percent from the 276,113 tons exported in 1988. In 1988/89, May-August exports accounted for nearly half of the 560,009 tons exported. In 1989/90 exports may not drop off as they did a year earlier, but supply should be adequate for domestic use without sharp rises in prices.

The number of roughage-consuming animal units (RCAU's) on hand for 1989/90 is estimated at 77.7 million, up 1 percent from 1988/89. Hay supply per RCAU is expected to be 7 percent greater than the 2.01 tons in 1988/89. Disappearance per RCAU will likely be up from 1988/89's 1.78 tons, but not as much as 1987/88's 2.02 tons because disappearance at 2.02 tons would imply a hay carryout of 11 million tons, 36 percent lower than in 1988/89.

Pasture and range conditions were rated at 70 percent on November 1, compared with 59 percent last year and a 1978-87 average of 76 percent. Thus hay feeding likely started near the usual time and not as early as last year. Weather conditions this winter and next spring will bear heavily on the extent to which hay prices rise. An early spring would enable ranges and pastures to provide grazing early and reduce hay needs. However, if spring is late or growing conditions are poor, hay feeding will extend further into the spring with more upward pressure on prices and greater depletion of old-crop stocks.

Feed Demand

Feed and residual use of the four feed grains—corn, sorghum, barley, and oats—totaled 118.8 million metric tons in 1988/89, down from 145.5 million in 1987/88. Use is expected to rebound in 1989/90 and may total close to 128 million metric tons.

The index of grain consuming animal units (GCAU's) for 1989/90 is expected to be up 1 percent from the 76.5 million units in 1988/89. GCAU's in 1988/89 were up less than one-half of a percent from 1987/88, although feed and residual use of grain was down. The increase in GCAU's reflects expanded broiler and turkey production along with continued large numbers of pigs per litter and some increase in sows farrowing. However, GCAU's have been relatively steady from 1980/81 through 1989/90—ranging about 3.5 million units from high to low. The stability reflects little change in dairy cows, some decline in cattle on feed and hogs fed, but an increase in broilers and turkeys.

In contrast, the index of roughage consuming animal units (RCAU's) has ranged 12.6 million units high to low, reflecting a decline in the numbers of dairy cows, beef cows, and beef animals outside feedlots. GCAU's and RCAU's were nearly the same in 1987/88 and 1988/89. However, if the beef cow herd begins to expand as expected, RCAU's in 1989/90 may increase 1 percent from the 76.6 million in 1988/89.

The feed units needed by State were estimated for 1988/89 and 1989/90. The State estimates rely on data from USDA's National Agricultural Statistics Service for the number of animals in the annual inventories for the beginning of 1989. Where States were combined in the livestock inventory, the estimate of feed unit needs per State used the average for the combined States. The estimates for 1989/90 are based on

Figure 5
Grain and Roughage Consuming Animal Units

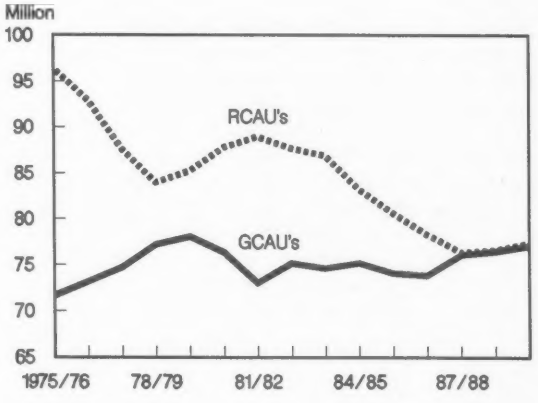


Table 3--Feed units by State

States	Grain		Roughage		Grain & roughage	
	1988/89	1989/90	1988/89	1989/90	1988/89	1989/90
	Billion units					
Alabama	8.86	9.32	9.20	9.27	18.07	18.59
Alaska	0.02	0.02	0.06	0.06	0.08	0.08
Arizona	2.69	2.61	4.09	4.17	6.77	6.78
Arkansas	12.87	13.44	9.42	9.46	22.29	22.90
California	16.58	16.74	25.91	26.13	42.49	42.87
Colorado	7.78	7.51	11.76	12.00	19.54	19.51
Connecticut	0.64	0.65	0.49	0.49	1.13	1.14
Delaware	2.17	2.29	0.20	0.20	2.37	2.49
Florida	4.05	4.13	10.75	10.81	14.80	14.94
Georgia	11.55	12.02	8.29	8.34	19.83	20.36
Hawaii	0.45	0.44	1.01	1.02	1.46	1.46
Idaho	2.95	2.87	8.08	8.16	11.03	11.03
Illinois	13.51	13.74	11.14	11.26	24.64	25.00
Indiana	13.12	13.21	7.84	7.93	20.96	21.14
Iowa	30.11	30.73	27.11	27.52	57.21	58.25
Kansas	13.81	13.48	24.99	25.46	38.80	38.94
Kentucky	3.85	3.84	13.56	13.63	17.41	17.48
Louisiana	1.26	1.27	5.69	5.72	6.95	6.99
Maine	1.01	1.03	0.68	0.68	1.69	1.71
Maryland	3.67	3.79	2.04	2.04	5.71	5.83
Massachusetts	0.32	0.31	0.48	0.48	0.79	0.79
Michigan	6.11	6.08	6.84	6.92	12.95	13.00
Minnesota	18.35	18.65	17.78	17.96	36.13	36.61
Mississippi	4.98	5.21	7.25	7.29	12.23	12.50
Missouri	10.01	10.09	24.18	24.33	34.19	34.42
Montana	1.82	1.77	12.41	12.48	14.23	14.25
Nebraska	21.48	21.20	21.34	21.93	42.82	43.13
Nevada	0.43	0.42	2.53	2.55	2.97	2.98
New Hampshire	0.15	0.15	0.35	0.35	0.50	0.50
New Jersey	0.42	0.42	0.53	0.53	0.94	0.95
New Mexico	1.69	1.65	7.14	7.19	8.82	8.84
New York	4.90	4.83	9.97	9.99	14.87	14.83
N. Carolina	14.97	15.63	5.91	5.99	20.88	21.61
N. Dakota	1.98	1.98	8.44	8.49	10.42	10.47
Ohio	9.38	9.44	10.22	10.31	19.59	19.75
Oklahoma	5.88	5.87	25.61	25.81	31.49	31.69
Oregon	2.20	2.19	7.60	7.65	9.79	9.84
Pennsylvania	9.49	9.63	11.71	11.78	21.20	21.41
Rhode Island	0.05	0.05	0.04	0.04	0.09	0.09
S. Carolina	2.61	2.57	3.30	3.31	5.91	5.88
S. Dakota	6.96	6.97	18.19	18.35	25.16	25.31
Tennessee	4.23	4.16	12.41	12.45	16.63	16.61
Texas	23.48	22.99	67.24	67.98	90.72	90.98
Utah	1.39	1.38	4.58	4.61	5.97	5.99
Vermont	0.86	0.86	1.90	1.90	2.76	2.76
Virgina	5.15	5.38	9.14	9.21	14.28	14.59
Washington	3.45	3.41	6.55	6.62	10.00	10.03
W. Virginia	0.92	0.95	2.69	2.70	3.61	3.66
Wisconsin	12.46	12.21	24.97	25.03	37.43	37.23
Wyoming	1.21	1.18	7.37	7.42	8.58	8.59
U.S.	328.30	330.79	521.02	526.10	849.31	856.89

expected livestock and poultry production, and assume the State distribution remains the same as in 1988/89. Feed units were computed from GCAU's and RCAU's, and use conversion factors developed from base feeding activity in 1969-72. A feed unit is defined as the equivalent of a pound of corn containing 78.6 percent total digestible nutrients, and is used to convert all feeds to a corn equivalent.

There is a large variation in the number of animals fed among the States, with Iowa, Texas, and Nebraska needing the most feed units from grain, and Alaska, Rhode Island, and New Hampshire needing the least. The growth in broiler and turkey production has increased the number of feed units needed in States having large numbers of birds, but North Carolina is the only major poultry producing State near the top of the States needing the most feed units. The number of hogs fed, cattle on feed, and dairy cows tends to play a more important role in grain needed in particular States. In terms of feed units from roughage, Texas has more animals needing roughage than any other State—more than two times as many feed units as the next largest State, Iowa. Rhode Island needs few feed units from roughage, slightly less than Alaska and Delaware.

Feed demand by the dairy sector in 1989/90 may be nearly the same as in 1988/89. Dairy cow numbers in 1989/90 are expected to decline 1 percent from 1988/89. Dairymen likely will keep concentrate feeding at a high level in response to very favorable milk/feed price ratios. Gains in output per cow are expected to more than offset the decline in cow numbers and milk production could increase nearly 2 percent.

In 1988/89, milk production totaled 145.58 billion pounds, up from 144.9 billion in 1987/88. The average number of cows was 1 percent below the year earlier, but output per cow was higher. In July-September 1989, milk per cow was below a year earlier after being above in the first three quarters of the year. Grain and other concentrates fed daily on October 1 totaled 16.9 pounds, the same as a year earlier, after being above the previous year in July and April.

Fed cattle marketings in 1989/90 are expected to be up about 1 percent from 1988/89. While the number on feed at the beginning of the year was down 6 percent, there are more yearling feeder cattle available for feeding than a year ago. Thus, the numbers going into feedlots in 1989/90 are likely to increase.

In response to poor returns in 1988/89, hog producers reduced the breeding inventory and pork production may be down about 1 percent. However, with improved returns in 1989/90, sow farrowings may increase and set the stage for larger pork production in early 1990/91. This could push feed use by the hog sector up slightly in 1989/90.

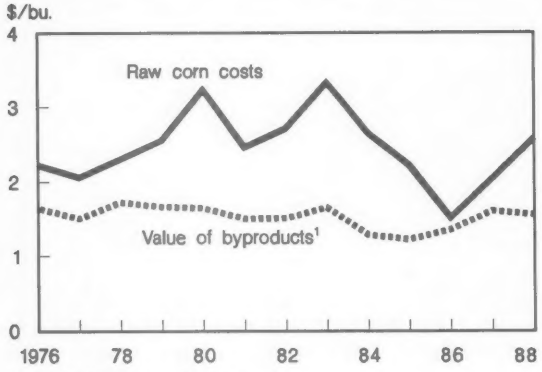
The poultry sector in 1989/90 will likely increase feed use because broiler and turkey numbers are expected to be up sharply from 1988/89. Strong prices in 1989 for broilers and eggs have offset high feed costs early in the year, enabling producers to attain profitable operations, thus setting the stage for increased production next year. Turkey producers have had mixed returns in 1989, but are currently expanding production.

Food, Seed, and Industrial Use of Corn

Food, seed, and industrial (FSI) use of corn in 1988/89 is estimated to have represented 17 percent of total use, up a little more than 1 percentage point from 1987/88. FSI use in 1989/90 is expected to increase 2 percent to 1,275 million bushels, or slightly below 17 percent of total use.

Few industrial and food uses require the whole corn kernel. Thus, the price of corn is only the gross cost to the processor with net costs depending upon the prices for the byproducts. For example, in wet corn milling, corn oil and gluten feed and meal are sold as byproducts. For each bushel of corn

Figure 6
Wet Milling Corn Costs



1/ Includes corn oil, gluten feed, and meal.

ground, wet millers can expect to realize approximately 13 pounds of gluten feed, 3.1 pounds of gluten meal, and 1.7 pounds of corn oil.

The figure shows average marketing year prices for corn in central Illinois and the value of corn wet milling byproducts—Midwest byproduct prices times expected quantities per bushel—from 1976/77 through 1988/89. The difference between corn cost and the value of the byproducts is the estimated net cost to the wet miller to produce starch-based products. Net costs have been highly variable, reflecting the variation of corn prices and prices for the byproducts. Net costs were lowest in 1986/87, rose in 1987/88, and jumped with the higher prices in 1988/89 because of the drought-reduced crop. Net costs ranged from a high in 1983/84 of $1.68 to a low of 16 cents in 1986/87. Byproduct credits ranged from $1.22 in 1985/86 to a high of $1.73 in 1978/79. Meantime, corn prices varied from $1.51 in 1986/87 to $3.33 in 1983/84.

Corn used to manufacture high fructose corn syrup (HFCS) in 1988/89 increased about 1 percent from the 359 million bushels used in 1987/88. This is the lowest year-to-year increase during 1976/77 to 1988/89. Trade reports suggest the unusually cool, wet summer dampened demand for soft drinks, a major user of HFCS. The beverage industry uses an estimated 75 percent of HFCS. If weather is more normal in 1989/90, sales of beverages will likely increase and thus, use of HFCS.

Glucose and dextrose manufacture in 1988/89 was up 5 percent from the 187 million bushels of corn used in 1987/88. The use of corn to manufacture glucose and dextrose grew very little during 1980/81 through 1987/88. Growth is expected to slow from the year-earlier rate in 1989/90 and 200 million bushels of corn may be used.

Starch production used 164 million bushels of corn in 1988/89, down from 167 million in 1987/88. Starch is used in the manufacture of paper and other items and use usually grows when the economy is growing. With the economy expected to expand in 1990, corn used to manufacture starch in 1989/90 is expected to increase nearly 1 percent from 1988/89.

Corn used in alcohol production is expected to increase in 1988/89 from the 336 million bushels used in 1987/88. The decline in demand for HFCS in late summer caused some wet millers, who have the ability, to shift from HFCS to alcohol production. Thus, it is expected that corn used in alcohol production by wet millers will increase 5 percent from the 200 million bushels used in 1987/88. Alcohol production by some dry mill operations was discontinued because of the high cost of corn in 1988/89. These plants are coming back into production and are expected to increase the use of corn to make dry milled alcohol. In 1988/89, 133 million bushels of corn were used, down 3 million from 1987/88.

Table 4--Corn: Food, seed, and industrial use 1/

Year beginning September 1	Wet-milled products				Dry-milled alcohol	Dry-milled and alkaline cooked products	Seed	Total
	HFCS	Glucose and dextrose	Starch	Alcohol				
	Million bushels							
1975	45	162	116	5	20	154	20	522
1976	62	164	116	10	15	155	20	542
1977	80	170	124	10	20	158	20	582
1978	105	170	124	15	20	155	20	609
1979	127	170	120	25	20	158	20	640
1980	165	183	120	35	35	160	20	718
1981	185	183	130	83	35	162	19	797
1982	215	188	127	130	50	170	15	895
1983	256	189	147	150	50	164	19	975
1984	310	187	143	170	100	160	21	1,091
1985	328	188	152	185	127	161	19	1,160
1986	339	185	155	200	135	161	16	1,191
1987	359	187	167	200	136	163	17	1,229
1988	362	196	164	210	133	161	19	1,245
1989	380	200	165	215	135	161	19	1,275

1/ Data are estimates based on production and sales figures from Government and private industry.

Dry milled and alkaline cooked products were down slightly in 1988/89, mainly because consumers shifted from corn-based breakfast cereals to oat bran cereals. Corn used in dry milled and alkaline cooked products in 1989/90 is expected to equal the 161 million bushels used in 1988/89.

Transportation Outlook

Immediate and Long Term

Short Term

The U.S. grain distribution and storage system is large, efficient, flexible and responsive to changing circumstances. While the Mississippi River's capacity promises to be slightly reduced by lower water from October 1989 levels, overall rail and barge capacity should meet the anticipated needs for the remainder of the 1989/90 crop year. The number of jumbo covered hopper cars available is above a year earlier. Rail shipments of grain during September-October 1989 averaged 10 percent below the same months of 1988, indicating substantial additional capacity is available.

The Soviet's recent 8-million-ton corn purchase, scheduled for delivery largely in November and December, will likely strain the distribution system. Normally, this grain would move down the Mississippi River and its tributaries for loading at Louisiana Gulf ports. But the volume purchased approximates the 60- day loading capacity of Louisiana Gulf export elevators. Since grain and oilseed exports to other destinations are also anticipated during that period, some shipments likely will be diverted to other ports, and the diversions have already begun.

By mid-November 1989, grain deliveries to South Atlantic ports by rail averaged 210 percent above September 1989. These deliveries chiefly consisted of wheat shipments through Baltimore and Norfolk. While the Mississippi River system will move as much as possible, given the water level and lock and dam problems, the rail system has been operating at only 80-85 percent of capacity. Railroads have demonstrated the ability to carry an additional 500,000 tons of grain each week above the October 1989 average. Over an 8-week period, this recently unused capacity amounts to about half of the USSR's corn purchases and offers a safety valve for the entire distribution system.

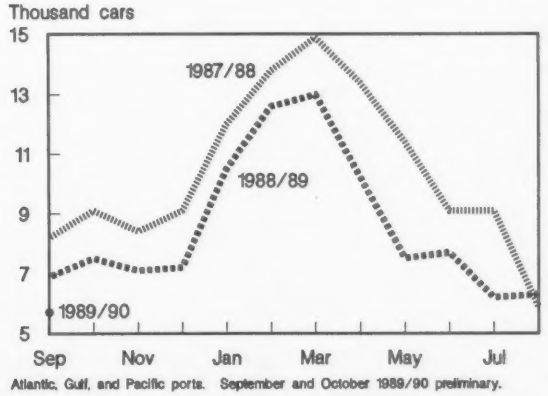
Barge Outlook

Since June 1988, the Mississippi River system has been hampered by drought-induced low water. The water level at St. Louis in 1988 averaged 54 percent below the 1944-88 average as measured at the flood gauge. Through October 1989, St. Louis water levels have been down 60 percent from 1944-88. While these low levels have hampered navigation, barges moved an average 3.2 million tons per month during 1988, and a like amount through October 1989.

It should be noted that water depth at a flood gauge is not the same as channel depth. So long as a 9-foot deep channel can be maintained, river traffic flows nearly unimpeded. Shallow water, however, impedes the movement of barges in fleeting areas, places where barges are moored awaiting further movement. Low water also can impede navigation around river elevators and may limit the draft to which a barge can be loaded at the river house.

To conserve water supplies, the Missouri River's flow is being reduced. This is expected to lower water levels on the lower Mississippi River. In turn, draft and tow size restrictions, such as prevailed in the latter half of 1988, are anticipated. Barges are expected to be required to cut their loaded draft from 9 to 8.6 feet. This restriction will reduce

Figure 7
Rail: Weekly Average Grain Unloadings



Atlantic, Gulf, and Pacific ports. September and October 1989/90 preliminary.

Figure 8
River Stages at St. Louis

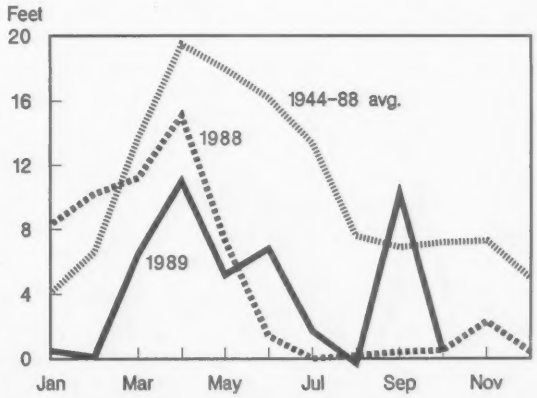
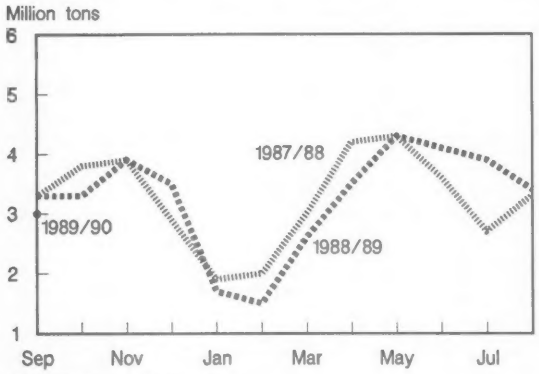
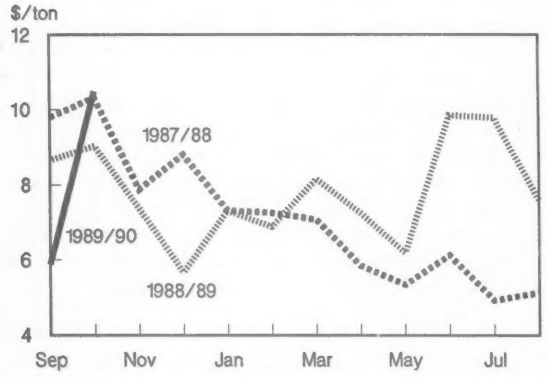


Figure 9
Average Monthly Grain Shipments



Mississippi River and Illinois Waterway.

Figure 10
Barge Rates to New Orleans



From Peoria, Ill.

the capacity of most barges from 1,500 tons to about 1,400 tons. In July 1989, with similar restrictions in place, 3.9 million tons of grain were shipped on the Illinois and Mississippi River systems.

The Soviet Union's purchases appear likely to result in substantially increased barge volume. In October 1989, 3.9 million tons of grain were shipped on the Mississippi and Illinois systems, up from 310 in September. For November and December, volume is expected to remain in the 3.5-3.9 million tons per month range.

Barge rates soared throughout October in response to increased demand and in anticipation of further increases. In mid-September, rates from Peoria to St. Louis averaged $6.19 per ton. By mid-October, they had risen to $9.74 per ton and by the end of the month climbed to $13.95, a record increase for the period.

Since grain marketing firms typically purchase transportation services for future months, some barge shipments for the Soviet purchases will move at earlier, lower, price levels. Thus, the October jump in spot rates probably overstates the rise in average costs.

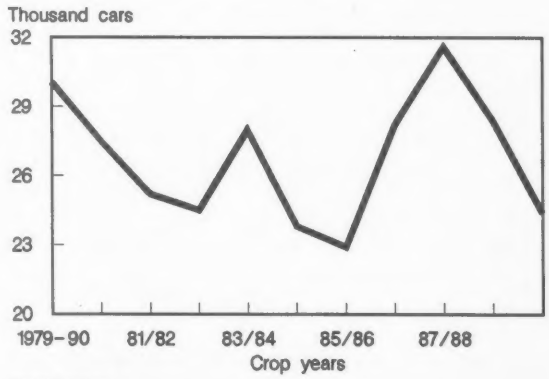
Rail Outlook

Rail volumes are also likely to increase. In October, nearly 29,000 cars of grain were shipped each week, up 18 percent from September, but well below the average of 30,600 cars per week of October 1988. As measured by the Burlington Northern's offer prices for Certificates of Transportation (COT), there is no evidence that railroads have raised base rates. Bid rates (the charges paid by shippers), however, increased slightly between mid-October and the first week in November.

The highest bid for west-bound corn in 54 car unit trains with delivery of cars to shippers in December rose nearly 4 percent to $135,907 per unit between October 16th and November 13th.

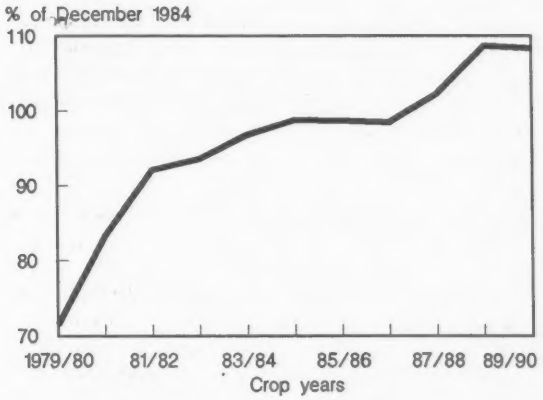
Most of the export grain carried by rail moves under contract rates. While these rates are renegotiated at set intervals, the contracts preclude rate increases in response to short term changes in demand. Even so, total transportation costs borne by the grain marketing industry will rise substantially. Barge rates are up. Bids for COTs are up. In addition, the diversion of export grains from the Gulf ports will entail increased rail shipments to Pacific coast, Atlantic, and Texas Gulf ports. Rail rates are normally well above barge rates for comparable movements, thus these diversions will markedly increase the total transportation bill.

Figure 11
Rail Car Loadings of Grain and Soybeans



Weekly average.

Figure 12
Rail Rate Index for Grain



Rising ocean freight rates will also contribute to the increase in total charges. Ocean rates for grain have trended upward since August 1989 and turned up sharply in October. Moreover, rates from Great Lakes ports are normally much higher than those from Atlantic or Gulf ports. For example: during the first quarter of 1989, rates from the Great Lakes to Europe averaged $23.13 per metric ton, compared with $14.37 and $14.40 for shipments from Atlantic and Gulf ports, respectively. Thus diversions to Great Lakes ports will swell the total transportation bill.

The magnitude of the overall increase in transportation charges may cause foreign buyers to stretch out delivery dates into January, thus easing the strain on both domestic and ocean transportation.

The Longer View

For the balance of the crop year, the transportation outlook is much more favorable. The new lock and dam structures at Alton, Ill. promise to speed barge shipments. The U.S. Army Corps of Engineers expects to make the new 1200-foot-long lock below Alton operational in mid-December. The Corps believes that the backlog of tows that now exists above the old lock 26 structure will be dissipated within a week or two following opening of the new chamber. In early January, the Corps plans to close the new lock for 6 days to complete construction of the new lock and dam complex. Upon reopening, the new structure will have twice the capacity of old lock and dam 26. The supply of rail cars has increased slightly during 1989 and total demand for coarse grains and soybeans is now projected to be 346.37 million metric tons, 3 percent above 1988/89.

Freight Car Supply To Remain Adequate

For the most part, grain shipped by rail is carried in jumbo covered hopper cars with capacities of 4,000 cubic feet or more. These cars carry nearly 100 tons of grain each and protect their cargoes from weather and outside contamination. Both railroads and shippers own cars of this sort, with railroads often leasing private cars to swell the fleet under their control.

The increase in private cars between January 1981 and January 1983 resulted from delivery of cars ordered to meet the large export demands of the late 1970's and early 1980's (table 5). The variations since 1983 result chiefly from removal of these cars from service or returns to service as demand for grain rose and fell, and from transfers to railroad-owned fleets. Railroads also removed cars from service when grain marketings were stagnant and returned them to service in 1988 and 1989 as the market quickened.

In mid-October 1989, 242,300 jumbo hoppers were available for use, up nearly 5 percent from the prior year. Not all of these cars will be used for grain shipments. They are used by other free flowing commodities, such as plastic pellets or fertilizer, which require protection from the elements.

Since export demand in November and December is expected to take up most of rails' unused capacity, the delivery of some cars to shippers can be expected to be delayed in those months. Later in the 1989/90 crop year, the car surplus situation should reappear. In 1987/88 total grain and soybean use amounted to 369.4 million metric tons, nearly 6 percent above the volume projected for 1989/90. The total jumbo covered hopper car inventory rose more than 2 percent between September 1, 1987, and October 1, 1989. Thus the relative availability of hopper cars promises to be larger for most of the 1989/90 year than in 1987/88 when some car shortages were reported in the northern wheat producing States.

Moreover, wheat exports through the Pacific Northwest ports require a relatively large number of car days compared with shipments to Texas ports. Wheat exports are now forecast to be 20 percent below 1987/88, and more than 10 percent below 1988/89. Total use of wheat is forecast to be only 3 percent below 1988/89, but nearly 14 percent below

Table 5--Jumbo covered hopper cars (4,000 cu. ft. and over) 1981-1989, selected months

Month & year	Inventory		
	RR owned	Private	Total
Jan. 1981	117.1	101.0	218.1
Jan. 1982	122.2	108.5	230.7
Jan. 1983	120.2	112.5	232.7
Jan. 1984	122.3	111.3	233.6
Jan. 1985	123.5	114.7	238.2
Jan. 1986	123.5	115.5	239.0
Jan. 1987	121.5	113.1	234.6
Jan. 1988	122.2	114.2	236.4
Jan. 1989	131.7	105.9	237.6
Oct. 1989	131.3	111.0	242.3

Source: Semi-Monthly Revenue Freight Car Summary, AAR.

1987/88. Thus rail service will be more available for other grains and oilseeds than in the 2 prior years.

Although the size of the hopper car fleet fluctuates monthly as cars are removed from service for repairs and later returned to service, it is clear that total fleet size has remained nearly level since 1985. About 7,300 new cars were added to the fleet in 1988 and 9,000 additions are forecast for 1989 and 1990. It appears likely that the size of the hopper car fleet will remain at about current levels into the 1990's.

Several new car types are under evaluation by railroads and shippers. Of these, the articulated covered hopper car is of special interest to grain shippers. This car is essentially two covered hopper cars, joined together, with one set of wheels at each end and a third set in the middle under the connector. This car offers 131 tons of capacity, in contrast to 100 tons for current models. These cars also offer a 20-percent improvement in the ratio of loaded to empty weight. Thus, significant operating efficiency would become available if they are introduced.

World Coarse Grain Outlook

Global production of coarse grains in 1989/90 is projected to increase 11 percent to 808 million tons. A 49-percent rise in U.S. output will provide most of the increase. Foreign production is forecast up about 1 percent to 584.5 million tons. Production estimates for Northern Hemisphere countries are becoming more firm, with most harvests complete, while the bulk of Southern Hemisphere crops have just been planted.

Global consumption is projected to rise 3 percent in 1989/90, with foreign gains accounting for more of the increase than the United States. U.S. coarse grain consumption is forecast to rise almost 10 million tons, and foreign consumption about 13 million. World ending stocks are projected to decline nearly 12 million tons, the third consecutive annual drop. This would result in a stocks-to-use ratio of 16.3 percent, down from 18.3 percent in 1988/89. World coarse grain trade is expected to increase 5 percent in 1989/90, the second consecutive year of significant growth, largely because of continued strong import demand by the Soviet Union.[1]

Southern Hemisphere Production Outlook

Argentina's coarse grain crop in 1989/90 is forecast to recover somewhat from the devastating drought of the previous year. However, this rebound will not be as great as earlier expected because of lower plantings. Both corn and sorghum sowings are likely to be below last year because of dry conditions in some areas and farmers' expectations of more favorable returns from oilseeds. More coarse grain area could be lost to sunflowers than to soybeans this year because of relative prices and sunflowers' ability to withstand dry conditions, an important concern for many farmers.

Argentina's corn production is still projected to rise about 50 percent to 7.2 million tons and sorghum about 70 percent to 1.3 million tons. These gains reflect better yields and more harvested area because of less abandonment, assuming normal weather for the rest of the season. Government efforts to encourage production through reforms, such as reducing export taxes and changing exchange rate policies, are apparently having a limited impact.

Elsewhere in the Southern Hemisphere, planting of Brazil's corn crop is also underway. The pace is reportedly running behind normal because of some uncertainties about credit policies and upcoming election results. Production is forecast at 25.5 million tons, down slightly from 1988/89. Corn area is expected to remain close to last year's level, but some shifts to or from soybeans are possible in the next few weeks.

In South Africa, corn area is also likely to remain close to last year. However, more average yields are forecast for 1989/90 after exceptionally good conditions and a bumper 1988/89 crop. South Africa's corn production is projected at 8 million tons, down about one-third.

The outlook for Australia's 1989/90 sorghum crop, now being planted, is mixed. Area will probably slip, in part because some land in Queensland was not available for planting the early crop after a large wheat crop, which is just being harvested. However, sorghum yields should improve after excessive rains hurt the 1988/89 crop, and production is forecast at 1.4 million tons, up about 25 percent.

Australia's 1989/90 barley crop, now beginning to be harvested, is forecast at 3.4 million tons, slightly above the previous year. Yields were hurt by an extended period of abnormally dry conditions in August and September. After a mostly favorable growing season, heavy late rains damaged the oats crop, cutting production and lowering quality. Output is forecast at 1.4 million tons, down 30 percent from last year because of the sharp reduction in area harvested and lower yields.

Recovery in Eastern Europe Offsets EC Decline

Coarse grain production in the EC is forecast at 81 million tons, down 8 million tons because of lower area and yields. This would also be the lowest EC outturn since 1983/84. More than half of the drop is in barley, about a third in corn, and the rest in oats. However, because of a large wheat crop, total EC grain production estimated by the European Commission will slightly exceed the 160-million-ton thresh-

[1] All trade years referred to in this section are October-September and exclude intra-EC trade unless otherwise specified.

old used in calculating price supports. (USDA's estimate is 160.3 million tons.)

A 3-percent reduction in EC intervention prices is mandated for 1990/91 because the official estimate is above the threshold. This has led to a storm of protests by EC farmers—already opposed to these "price stabilizers"—because the crop estimate is very close to the threshold and the estimate could change in coming months. Under current rules, the EC makes only one estimate of crop size for the stabilizer calculations. However, the Commission has proposed that no additional coresponsibility levy will be collected for 1989/90.

In contrast to the EC, coarse grain production in Eastern Europe is expected to rise more than 8 million tons to 69.1 million, the best crop in 3 years. The estimate mainly reflects sharply higher corn yields in Yugoslavia and Romania, where drought and heat had reduced crops in 1987/88 and 1988/89.

Canada also recovered from drought and its 1989/90 coarse grain output is forecast at 23.2 million tons, up 18 percent. A larger barley crop accounts for the biggest gain. However, untimely rains during harvest in Alberta, the largest growing area, hurt barley quality and the amount of malting barley will be below average. Increases are also forecast for Canada's oats, corn, and rye crops.

China's coarse grain harvest is expected to be down marginally from last year. The major crop—corn—is forecast to fall 2 percent. Despite some policy uncertainties and the potential lure of competing enterprises, estimated corn area did not decline, but rose slightly. However, corn yields are estimated to have dropped because of drought in northeast China.

Forecast 1989/90 production of coarse grains for the Soviet Union is up 8 million tons, mostly because of gains in barley and rye. There is a smaller increase forecast for oats and virtually no change for corn. Increased wheat production is also expected, leading to a total grain crop forecast at 208 million tons. Both coarse grain and wheat area have fallen this year, but forecast yields are up. While the projection of total grain output is 13 million tons above last year, the official target for 1989/90 was 241 million tons.

Soviet Demand Sustains World Trade

World coarse grain trade in 1989/90 is projected at 99.3 million tons, up 5 percent from 1988/89. Higher trade in corn will account for all of the increase, because sorghum, barley, and oats are all expected to decline.

The 1988/89 trade estimate of 94.4 million tons is below earlier expectations because of slower late season shipments by important suppliers, including the United States, South Africa, and China. But this volume of trade still represents a 13-percent rise from the previous year, and was the first increase in 3 years.

The key factor in the buoyant trade outlook for 1989/90 is robust import demand from the Soviet Union. Soviet imports are projected at 24 million tons for 1989/90, up 9 percent from the previous year, despite a slower start to purchases than usual. The Soviet Union is expected to again be the world's largest corn importer, ahead of Japan. Soviet corn imports are projected at 19.5 million tons, with barley at 3.4 million, sorghum at 800,000, oats at 200,000, and rye at 100,000.

The high level of anticipated Soviet purchases stems from continued emphasis on increasing livestock and meat production. Although the prospects of a rise in domestic grain production would normally signal lower Soviet imports, there are reports that forage supplies and grain procurements have been below expectations. In addition, large losses in grain harvesting and marketing remain a big problem.

One major question this year involves the mix of grains imported. Wheat imports are projected to be the lowest in over 10 years. One reason may be the high level of world wheat prices relative to corn. In contrast to coarse grains, the pace of early season wheat imports has been slow. Another factor may be the unprecedented level of opposition within the Soviet Union to importing wheat—seen as supporting foreign farmers over Soviet producers.

For the rest of the world, coarse grain imports are projected to rise 4 percent in 1989/90, the first increase in non-Soviet imports in 3 years. While the highest since 1983/84, this projection is still well below the levels of the late 1970's and early 1980's.

Most of the anticipated import growth in 1989/90 is in East Asia because of continued strong increases in Korea's purchases. Japan's imports are forecast to rise, but there is less certainty than usual because of the impact of Japan's rising meat imports on feed grain demand. China's imports are projected to rise based on early season corn purchases. Some import gains are also forecast for North Africa. The largest drop in coarse grain imports will occur in Eastern Europe because of better harvests there.

Foreign Consumption Gains Have Slowed

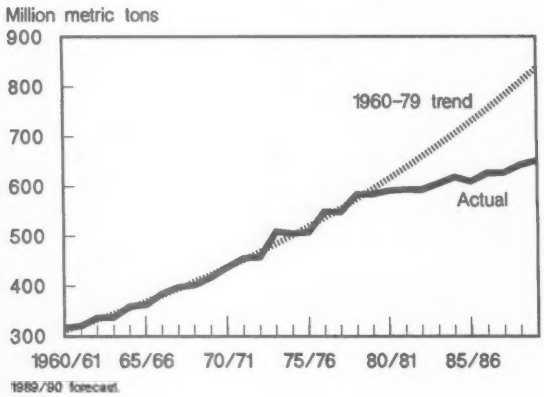
One factor contributing to stagnant coarse grain import demand in recent years has been smaller increases in foreign consumption (figure 13). During the 1960's and 1970's, foreign consumption increased at an average annual rate of 3.5 percent. However, during the 1980's, the rate has slipped to about 1.1 percent.

Changes in consumption have varied among categories of countries. For the developed countries, coarse grain use has actually declined in the last decade (figure 14). This mostly reflects a sharp drop in the EC that has more than offset increased use in Japan. The EC decline has numerous causes: reductions in size of the dairy herd, increased feeding of wheat and non-grain feeds, and increased use of wheat for starch production at the expense of corn. Since 1984/85, EC production of coarse grains has exceeded consumption, and the EC has emerged as a net exporter.

Although consumption growth for other countries has continued in the 1980's, increases have been slower than in the previous decade. For the centrally planned economies (CPE), the annual rate of increase has slowed to just over 1 percent, compared with an average of 4 percent in the 1970's. (The CPE grouping consists mainly of the USSR, China, and Eastern Europe.) There is considerable annual volatility in CPE consumption, however, because of the large influence of weather on domestic crop production, which accounts for most consumption. This has largely translated into volatile import patterns.

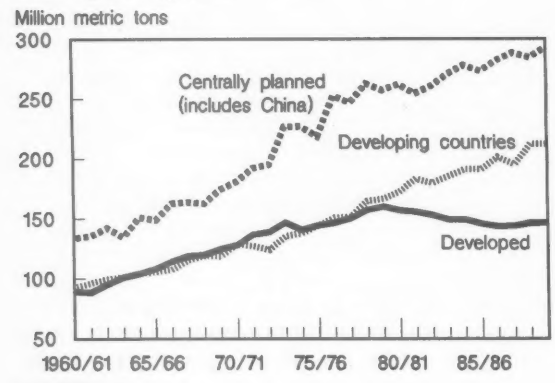
For the developing countries, including the newly industrialized countries, consumption increases have also slowed in the 1980's, but the pattern has been somewhat steadier. During the 1970's, consumption increased at an average annual rate of 3.4 percent. During the 1980's, it has dropped to 2.4 percent. Imports by the developing countries have also been increasing more slowly in the 1980's than in the 1970's.

Figure 13
Foreign Coarse Grain Consumption



1989/90 forecast.

Figure 14
Foreign Coarse Grain Consumption by Country Categories



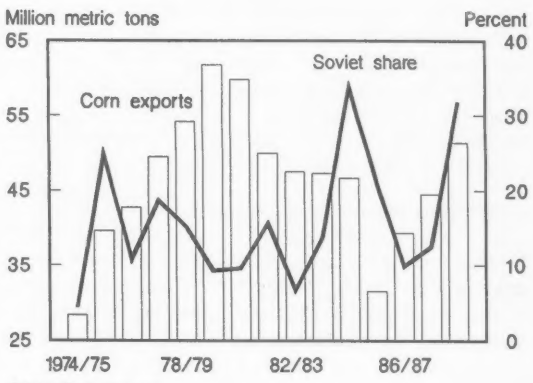
1989/90 forecast.

U.S. Coarse Grain Exports Projected To Rise 4 Percent

The United States is expected to export more corn and barley in 1989/90, while its sorghum exports fall. Corn sales are projected to rise 3.6 million tons, barley 300,000 tons, and sorghum to drop 1.6 million. U.S. coarse grain exports are projected at 63.5 million tons, up from 61.2 million in 1988/89. Competitor coarse grain exports are projected to rise by a slightly larger amount so that the U.S. share of the world market is likely to slip to 64 percent in 1989/90 from 65 a year earlier.

Large Soviet purchases of U.S. corn are expected to continue in 1989/90. As of November 2, the Soviet Union had purchased 8.1 million tons, well above a year earlier. Because there will be limited supplies of non-U.S. corn on the world market in the next few months, the Soviet Union is likely to continue buying U.S. corn. In late October, USDA raised the amount of U.S. grain that the USSR could buy in 1989/90 under the Long-Term Agreement without further consultations. The amount was raised from 12 million tons to 16 million, and includes both wheat and corn.

Figure 15
U.S. Corn Exports and Soviet Share



October–September year.

In 1988/89, the Soviet Union became the largest customer for U.S. corn with a sharp rise in purchases. The USSR accounted for nearly 32 percent of total U.S. corn exports, just below the record 34 percent of 1984/85 (figure 15). During the 1980's, the Soviet share of U.S. corn sales has averaged 17 percent a year, but the historical pattern is characterized by very large yearly fluctuations.

Competitor Corn Exports To Increase

Larger corn exports by South Africa, Argentina, and Eastern Europe are expected to more than offset declines by China, Thailand, and the EC, leading to a 2.6-million-ton increase in forecast competitor shipments in 1989/90. South Africa may emerge as the largest competitor, with its exports forecast to more than double to 3.7 million tons. South Africa has more white corn than yellow available for export this year. Most of its sales are likely to go to Japan, Taiwan, and Korea.

China's corn exports declined an estimated 15 percent in 1988/89 and are forecast to drop another 14 percent in 1989/90 to 3 million tons. Rising domestic feed use, some reported improvements in moving corn from surplus to deficit regions within the country, and a small drop in production account for the expected reduction. Lower estimated shipments to the USSR accounted for most of the export decline in 1988/89, with shipments to Japan rising slightly.

Exports by Argentina are forecast to increase 28 percent in 1989/90 to 3.2 million tons because of a larger crop. Its drought-reduced exports in 1988/89 were the lowest in more than 25 years. The chief destination for Argentina's corn was Iran, followed by Cuba, the EC, and the USSR. Shipments to the latter just topped 300,000 tons.

In Thailand, a smaller corn harvest and another sizable increase in domestic use are expected to lower corn exports by 50 percent in 1989/90. Exports are forecast at 700,000 tons, which would be the lowest since 1961/62. A 15-percent increase in Thai corn feeding is projected, after a 37-percent rise in 1988/89. This dramatic jump reflects not only growth in the poultry and pork sectors, but also sharply higher prices for rice in the last 2 years. This has limited feeding of broken rice and byproducts.

Corn exports by Eastern Europe are forecast up sharply to 1.5 million tons in 1989/90. Most of the rebound will take place in Yugoslavia, whose exports are projected at 1 million tons after none in 1988/89. Yugoslavia has already sold 350,000 tons to the Soviet Union. Export increases are also likely for Romania and Hungary.

Table 6--World coarse grain trade: Major exporters and importers by commodity, 1985/86-1989/90 1/

Item	1985/86	1986/87	1987/88	1988/89 2/	1989/90 3/
	Million metric tons				
CORN					
Exporters:					
U.S.	31.5	39.4	44.5	51.4	55.0
Argentina	7.4	4.0	3.7	2.5	3.2
China	6.4	3.8	4.1	3.5	3.0
Thailand	3.8	2.6	0.8	1.4	0.7
South Africa	1.5	2.6	0.8	1.6	3.7
Others	3.9	4.1	2.9	3.2	4.1
Total	54.5	56.4	56.7	63.5	69.7
Importers:					
Japan	14.6	16.1	16.7	16.0	16.6
USSR	10.3	7.6	8.1	17.5	19.5
EC-12	4.8	2.9	3.4	2.4	2.5
Korea, Rep.	3.6	4.6	5.0	5.7	6.4
Taiwan	3.1	3.5	4.0	3.9	4.2
Mexico	1.7	3.4	3.2	3.2	3.3
China	0.4	1.6	0.2	0.0	0.5
East Europe	2.2	1.7	2.2	2.4	2.0
Brazil	1.9	1.4	0.0	0.2	0.1
Egypt	1.9	2.4	1.4	1.2	1.4
Others	10.0	11.2	12.5	11.0	13.2
Total	54.5	56.4	56.7	63.5	69.7
SORGHUM					
Exporters:					
U.S.	4.1	5.1	6.1	8.1	6.5
Argentina	2.2	1.0	1.2	0.7	0.9
Australia	1.1	0.6	0.6	0.5	0.7
Others	1.3	1.2	0.4	1.6	1.1
Total	8.7	8.0	8.2	10.9	9.1
Importers:					
Japan	5.1	4.2	3.9	4.0	3.8
Mexico	0.6	0.8	0.9	2.1	1.6
Taiwan	0.8	0.8	0.3	0.4	0.2
Venezuela	0.8	0.8	1.7	1.1	1.0
Israel	0.5	0.2	0.4	0.4	0.4
USSR	0.1	0.1	0.0	1.2	0.8
Others	0.8	1.1	1.0	1.7	1.3
Total	8.7	8.0	8.2	10.9	9.1
BARLEY					
Exporters:					
EC-12	7.3	6.2	7.0	10.0	9.5
Canada	4.8	6.0	3.5	3.5	4.0
Australia	3.7	2.2	1.6	1.4	1.2
U.S.	0.8	3.0	2.9	1.7	2.0
Others	1.9	1.2	1.0	1.3	0.9
Total	18.4	18.6	16.1	17.9	17.6
Importers:					
Saudi Arabia	6.6	9.0	4.8	4.4	4.5
USSR	2.9	3.0	2.4	3.2	3.4
East Europe	3.3	1.3	1.7	2.5	2.0
Japan	1.5	1.2	1.3	1.2	1.2
Others	4.0	4.1	5.9	6.6	6.5
Total	18.4	18.6	16.1	17.9	17.6
COARSE GRAINS TOTAL TRADE	83.2	84.1	83.2	94.4	99.3

1/ October-September year, excludes intra-EC trade. Totals may not add because of rounding. 2/ Preliminary. 3/ Forecast.

Small Declines Likely for Competitor Barley and Sorghum Sales

Largely propelled by a favorable price relative to corn, sorghum trade in 1988/89 rose to an estimated 10.9 million tons, the highest in 4 years. The projected decline in U.S. sorghum exports in 1989/90 largely mirrors an expected 17-percent fall in world sorghum trade to 9.1 million tons. Total competitor sorghum exports are expected to change less.

Because of bigger crops, Argentina and Australia are forecast to raise exports by 200,000 tons each, to 900,000 and 700,000 tons respectively. China's sorghum exports are forecast at 1 million tons, down 17 percent, but still the second highest on record. China's exports soared in 1988/89 to an

estimated 1.2 million tons from under 100,000 tons the previous year, probably reflecting strong interest in boosting foreign exchange earnings and a sorghum market in China that is less tightly controlled than corn.

World barley trade is expected to fall only slightly in 1989/90 to 17.6 million tons. U.S. exports are forecast up 18 percent, largely because of larger expected EEP sales, and a 4-percent drop in competitor exports. A 500,000-ton drop in EC exports is projected to be offset by the same size increase for Canada. EC barley exports will still be very high at a forecast 9.5 million tons, and the pace of EC sales to date is only slightly behind last year's record. Australia's exports are projected down 14 percent to 1.2 million tons, the lowest in 7 years, because of rising feed use.

World trade in oats is also expected to decline in 1989/90 due to reduced U.S. imports. Canada's exports are forecast to fall by about a third to 500,000 tons because of lower shipments to the United States, its main customer. However, with a greatly improved crop, Finland's exports are projected to rise fivefold to 300,000 tons. Sweden's oats exports are also projected at 300,000 tons, a 12-percent increase over the previous year. In addition to sales to the United States, both Sweden and Finland are reportedly selling some oats to the USSR this year.

Trends In Concentrate Use

Larry Van Meir*

Abstract: Feed and residual use of total concentrates has shown no statistically significant growth or decline during the past 12 years (1977/78-1988/89). However, the high-protein feed portion of total concentrate use increased from an average of 15 percent for 1977/78-1979/80 to an average of 18 percent for 1986/87-1988/89. These changes in concentrate feeding reflect changes in livestock and poultry production and per capita consumption patterns for red meats and poultry. Per capita consumption, retail weight basis, of these items grew 0.7 percent a year, but this was the net result of a 0.7-percent rate of decline in red meat consumption and a 3.6-percent growth for poultry consumption.

Keywords: Concentrate use, protein, feed units, meat and poultry consumption.

Feed grain fed and residual disappearance in general, and corn in particular, are usually the data receiving most attention in discussions of livestock and poultry feeding. However, to focus on these data series alone ignores some important trends underway in livestock and poultry feeding. Data on feed and residual disappearance of total concentrates and their component parts reveal significant changes during the past 12 years.

Change in Concentrate Use

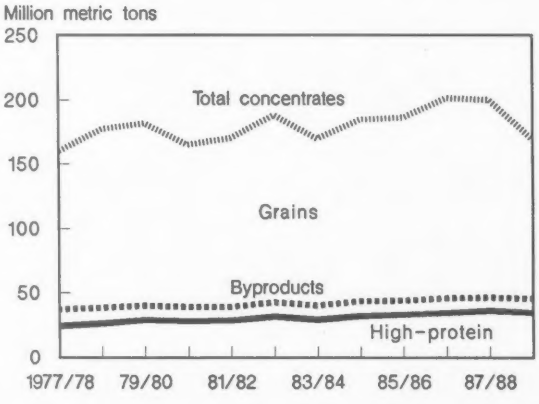
For the 12 years, 1977/78-1988/89, feed and residual disappearance of total concentrates trended upward nearly 1 percent a year (fig. A-1), but the trend did not meet the usual test for statistical significance. Feed and residual use of grains and byproduct-energy feeds (millfeeds, beet pulp, molasses, alfalfa meal, and inedible fat) dropped from 85 percent of total concentrate use in 1977/78-1979/80, to 82 percent in 1986/87-1988/89.

In contrast, use of high-protein feeds (oilseed meals, tankage and meat scraps, fish meal, brewers' dried grains, distillers' dried grains, dairy byproducts, corn gluten feed, and corn gluten meal) trended upward about 960 kilograms per year, or 3 percent. High-protein feeds increased from 15 percent of concentrate use in 1977/78-1979/80, to 18 percent in 1986/87-1988/89.

Trends in Livestock and Poultry Numbers

Aggregating livestock and poultry numbers as grain-consuming animal units (GCAU'S) provides the most accurate measure of the concentrate requirements for livestock and poultry production. The protein needs of livestock and poul-

Figure A-1
Concentrates: Feed and Residual Use



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try production are measured in high-protein-consuming animal units (HPCAU'S).

Total grain-consuming animal units have not increased during the past 12 years, but the number of poultry units has grown at an annual rate of 2.1 percent. Subtracting the poultry units from total GCAU'S yields a balance representing use by meat animals, dairy animals, and horses. This balance has decreased nearly 1 percent per year (fig. A-2).

High-protein-consuming animal units grew at an annual rate of 0.7 percent a year (fig. A-3). Based on recommendations of the National Research Council, rations for growing broilers and turkeys require about 20-21 percent protein over the growing period, compared with 16 percent for lactating dairy cows, 13-15 percent for fattening hogs, and about 11 percent for fattening cattle. Thus, the upward trend in HPCU's confirms the impact of rapidly rising poultry production on the feed requirements for livestock and poultry.

Figure A-2
Grain Consuming Animal Units

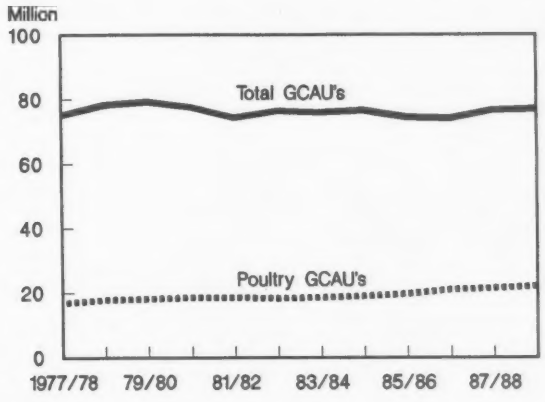
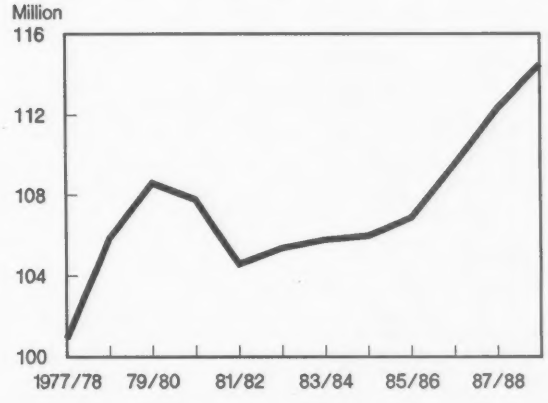


Figure A-3
High-Protein Consuming Units

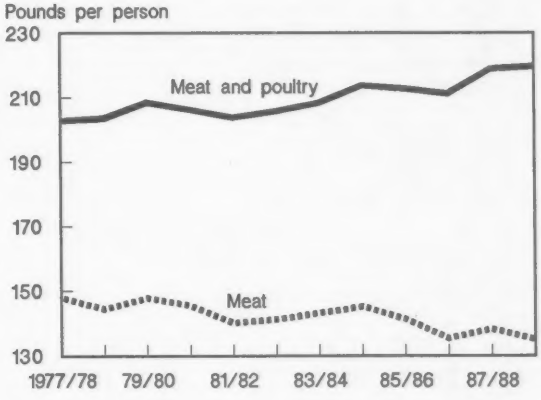


Trends in Per Capita Consumption of Meat and Poultry

The rapid growth in poultry production over the period indicates the underlying changes in red meat and poultry consumption patterns. Per capita consumption of red meat and poultry rose from almost 203 pounds in 1977/78 to nearly 220 pounds in 1988/89, or 0.6 percent per year. However, per capita red meat consumption declined from almost 148pounds to 135 pounds during this period—an annual decrease of 0.7 percent (fig. A-4). In contrast, per capita consumption of poultry rose from 55 pounds to nearly 85 pounds—an annual growth rate of 3.6 percent.

The increase in poultry production has a twofold impact on concentrate use. Less total concentrate is required per pound of ready-to-eat poultry produced than for red meats, but the composition of the feed used requires a higher proportion of protein. Therefore, significant growth in per capita consumption of total red meat and poultry the past 12 years was not accompanied by a commensurate increase in total concentrates consumed, but rather by a rise in the proportion of high-protein feeds consumed.

Figure A-4
U.S. Meat and Poultry Consumption



World Trade in Barley Malt and The U.S. Role

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Abstract: World trade in barley malt has increased substantially over the last 25 years, despite a brief decline in the mid-1980's. Growth in trade is largely linked to trends in beer production. The European Community (EC) is the world's dominant exporter; the United States ranks among the smaller suppliers. U.S. barley malt exports have started to rebound in the 1980's after a long decline.

Keywords: Barley malt, malting barley, trade, market participants, Export Enhancement Program (EEP).

The world market for barley malt has grown dramatically over the last quarter-century, expanding more than fourfold between 1961 and 1988. Although the growth rate started to slow in the early 1980's and then declined in the mid-1980's, trade has since gained ground. Barley malt trade, including intra-EC trade, reached a record in 1987 and again in 1988. The volume of world trade in 1988 was nearly 3.3 million tons, valued at more than $900 million.

This dynamic world market has largely bypassed the United States. After peaking in the late 1940's, U.S. barley malt exports experienced a long-term decline through the next 3 decades. Since 1982, however, U.S. exports have begun to rebound. This increase stems largely from domestic developments: more abundant supplies of barley and more attractive malt prices, plus a levelling off in domestic demand for barley malt after a long period of expansion. In addition, barley malt was included in the EEP in 1986.

Commodity Background

Barley malt refers to a processed form of barley. While malts are generally similar, their brewing characteristics vary and reflect different traits and qualities of the barley used for malting (referred to as malting barley).

Demand for barley malt stems primarily from demand for beer. Brewing accounts for about 95 percent of world malt use, and imports generally make up about one-quarter of total malt use. Most of the balance is used to distill whiskey and other spirits, with a very small amount used for malt extract and flour in various food products.

The basic steps in creating barley malt are steeping (moistening) the barley, germination, withering (removing excess moisture), drying, and screening. During germination, the starch in the grain is converted into a form of sugar.

Malting barley varieties generally are selected for grain conformation and size, water absorption rates, germination ability, color, and other desirable characteristics. The quality can vary substantially from year to year because of weather, which affects plumpness and protein content.

Malting barley commands a price premium over feed barley (which can fluctuate widely within countries and from season to season). Hot, dry weather at critical periods in the growing season often raises protein levels. When the protein is too high, it displaces starch and reduces extraction rates in the malting process. When this occurs, the barley is not used at all for malting and must go for feed.

Both two-row and six-row barley types are grown for malting, each having different properties and malting qualities. In the United States, six-row barley is usually grown in the key producing States of Minnesota and the Dakotas. This barley accounts for the bulk of U.S. malting use, concentrated in the upper Midwest (mainly Wisconsin and Minnesota).

Two-row barley is commonly grown in western States, and is used by western maltsters mainly located in Washington, Colorado, and Idaho. There appears to be little or no switching between two-row and six-row varieties by U.S. maltsters.

World Trade Patterns [1]

Over 100 countries import barley malt, including the EC and the United States (which also export it). World barley malt trade has grown at an average rate of about 6 percent per year over the last 25 years (fig. B-1). In the 1960's, the rate of growth averaged about 7 percent per year. Trade increased dramatically in the 1970's, with the volume more than doubling and annual growth averaging more than 9 percent. However, during the 1980's, average growth has fallen to 2 percent, reflecting a temporary import decline in the middle of the decade.

When adjusted to exclude intra-EC trade, world trade in 1987 reached about 2.4 million tons. Intra-EC trade has been growing steadily and in 1987 (the second year of the Community's expansion to 12 members) approached 725,000 tons. However, the EC regularly purchases some malt from outside sources, including the United States. (Full EC data for 1988 were not yet available.)

After peaking in 1983, world trade then faltered. Soviet imports dropped sharply, probably because of the drive to

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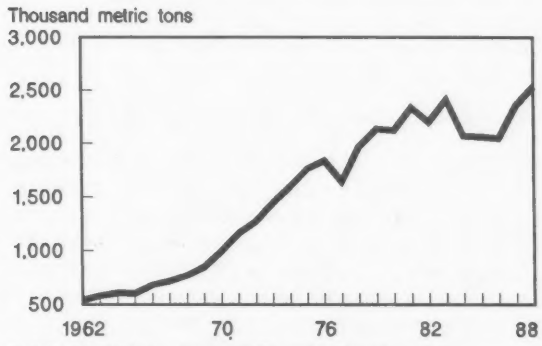
[1] This study is based on a database constructed from UN/FAO data and individual country statistics, as available.

Figure B-1
World Trade in Barley Malt



Excludes intra-EC trade. Assumes 12 EC members for entire period. EC exports excluding intra-EC trade for 1988 were estimated by author.
Source: FAO/UN data.

curb alcohol consumption. Imports by Japan, the world's largest buyer, also declined in the mid-1980's as changes in consumption patterns cut that country's demand for distilling malt. Finally, foreign exchange shortages and stagnant economic growth apparently constrained demand by many important importers among developing countries, including Brazil, Venezuela, Nigeria, and the Philippines.

In 1987, world malt trade resumed its upward trend. Imports by Japan increased substantially, reflecting great expansion in beer production. Brazil (the second largest buyer), the Philippines, and Venezuela also recorded significantly higher malt imports. In 1988, Japan, Colombia, and Brazil showed the largest expansions of import volumes. Reported heavy Soviet purchases for 1989, following virtually no imports in 1987 and 1988, should boost world trade in 1989.

Import Demand

Barley malt trade roughly parallels trends in beer production. World beer production displayed striking growth for many years, and averaged about 3.5 percent a year between 1962 and 1986. However, in the early 1980's, these increases slowed, and beer output declined in 1983 and 1984 before rebounding in 1985.

In general, beer production and consumption in the developed countries is slowing or steady, whereas growth in developing countries continues strong. China has shown the most dramatic growth in recent years. But because China produces most of its own malt, this has had little effect on the world malt market. Nevertheless China does import significant volumes of barley, mainly from Australia.

Many countries import virtually all the barley malt used in beer production, particularly some of the developing countries that do not grow barley themselves. However, some countries, including many in Latin America, also import some malting barley to produce malt. One of the world's largest malt importers, Brazil, also grows a large amount of its own malting barley.

Use of malt for distilling purposes has shown little growth in the last few years, largely reflecting stagnant or declining consumption of whiskey in most countries. But with the exception of Japan, imports of malt for distilling have normally been very small and have had a limited impact on world trade.

Overall imports of barley malt appear largely insensitive to price because the availability of substitutes is limited. Barley malt is the most important grain product used by brewers worldwide. In the United States, for example, it accounts for

Table B-1--Barley malt imports by leading importers

Country	Average 1961-69	Average 1970-79	Average 1980-84	1985	1986	1987	1988
				1000 MT			
Brazil	55.2	174.6	178.1	158.9	239.2	285.7	310.0
Cameroon	5.3	23.4	53.8	85.9	104.3	73.3	74.4
Colombia	2.9	1.5	21.4	44.0	39.6	34.4	74.7
Central America 1/	8.8	21.6	19.8	34.8	25.7	33.5	37.0
Dominican Republic	3.1	7.0	14.5	16.2	12.0	8.0	19.0
Jamaica	4.3	9.0	10.1	9.9	8.8	12.0	11.8
Japan	59.1	381.5	544.2	432.5	478.6	539.8	629.8
Nigeria 2/	9.6	51.1	130.3	161.0	95.7	171.4	100.0
Peru	5.4	20.0	27.3	32.7	28.2	54.5	40.0
Philippines	29.6	65.0	105.9	77.9	71.7	135.9	147.9
South Africa	7.7	28.6	68.9	62.3	71.0	52.0	56.0
Switzerland	80.5	98.8	81.9	95.8	96.5	85.9	94.7
USSR	38.4	122.8	245.1	186.9	51.9	3.1	0.0
United States	35.8	32.6	45.0	42.5	39.2	37.9	20.4
Venezuela	46.6	99.9	173.4	141.8	158.2	191.8	210.5
Zaire	20.4	45.4	26.6	49.5	46.0	47.0	40.0
Other 3/	239.1	398.0	481.6	429.0	478.7	629.5	NA
Total excl.intra-EC trade 4/	651.8	1,580.8	2,227.9	2,061.7	2,045.3	2,395.8	NA

NA= not available.
1/ Includes Costa Rica, El Salvador, Guatemala, and Honduras (per EEP offer). Excludes Nicaragua and Panama.
2/ FAO estimate for 1988 imports. May include smuggling.
3/ Calculated as total minus sum of above countries.
4/ Total based on reported exports. Assumes 12 EC members for entire period.

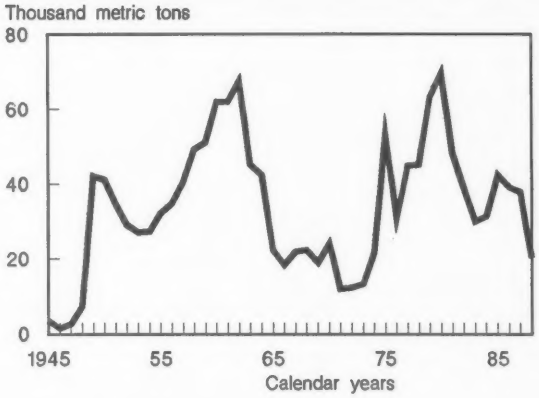
about two-thirds of total grains and products used in brewing. Corn, corn products, and rice are also used. The price of malt, however, may affect the quality that countries import, and different qualities of malt can change the amount of adjuncts used such as other grains and sugars.

Nigeria is attempting to replace imported barley malt with locally produced sorghum malt. Nigeria, the fourth largest buyer in the world in the mid-1980's, officially banned malt imports in January 1988, following similar bans on wheat, rice, and corn instituted to conserve foreign exchange and promote domestic production.

Some importers have a clear preference for certain types of malt and usually import barley malt from the same sources. However, historical buying patterns indicate that many importers have commonly changed suppliers over the years. A number of importers, particularly large ones, do not buy exclusively from one source, but from many different suppliers every year. In 1988, for example, Japan bought malt from 16 countries, including seven in the EC; Brazil imported from 14 countries, including six in the EC.

Ranked by size excluding EC members, the top 10 importers in 1985-87 were Japan, Brazil, Venezuela, Nigeria, the Philippines, Switzerland, Cameroon, the USSR, South Africa, and Zaire. Although all the EC countries import malt, they buy it mostly from other EC suppliers. Some of the EC countries—West Germany, the Netherlands, and Belgium—would rank among the world's largest importers if intra-EC trade were included. The United States regularly imports barley malt from Canada and in a number of years has actually been a net importer (fig. B-2). The volume of U.S. imports has varied considerably from year to year and reached a record of nearly 70,000 tons in 1980. During 1985-87, U.S. imports ranked 11th in the world. However, imports comprise a very small part of the total U.S. market, representing less than 2 percent of U.S. malt consumption in recent years.

Figure B-2
U.S. Barley Malt Imports



Major Barley Malt Exporters

The EC is the dominant supplier in the world malt market. EC exports to third countries grew faster than the combined shipments of all other exporters over the last two decades. During 1985-87, the EC market share averaged 56 percent, excluding intra-EC trade.[2] The next largest exporters (with 1985-87 average market shares in parentheses) were Australia (14), Czechoslovakia (11), and Canada (7). Together these four exporters typically account for almost 90 percent of world trade (table B-2).

The United States ranks among the world's smaller suppliers, whose exports often display more annual variation. In 1985-87, the top four exporters discussed above were followed by the United States (3), Uruguay (2), Finland (2),

[2] Trade data for the EC-12 was constructed back to 1962 for consistency, although the EC had fewer members in the earlier years.

Table B-2--Barley malt exports by leading exporters

Country	Average 1961-69	Average 1970-79	Average 1980-84	1985	1986	1987	1988
				1000 MT			
Argentina	13.0	38.1	14.0	11.2	5.9	0.2	0.2
Australia	71.2	172.5	342.4	222.4	258.0	356.4	360.0
Canada	83.4	148.4	227.9	162.1	140.4	164.6	177.0
Chile	7.7	19.9	32.5	19.6	14.8	42.9	40.4
Czechoslovakia	183.2	206.5	200.0	215.0	243.0	235.0	240.0
EC-12 1/	205.1	846.7	1,166.1	1,133.0	1,170.7	1,279.0	0.0
Finland	1.4	25.3	43.5	41.0	40.2	32.2	22.4
German Democratic Rep.	2.3	16.6	30.2	39.0	32.0	39.0	40.0
Poland	28.2	26.7	13.6	4.9	4.4	12.0	12.2
Sweden	3.3	5.4	23.0	7.6	5.8	12.7	15.1
Turkey	0.0	7.9	11.8	54.6	2.3	40.5	78.2
United States	35.7	32.0	39.2	43.9	39.0	105.6	65.5
Uruguay	3.7	16.9	42.3	45.1	46.9	47.9	62.4
Zimbabwe	0.0	4.9	10.3	10.4	11.8	12.1	12.0
Other	13.4	12.9	31.2	52.0	30.0	15.7	NA
World excl intra-EC trade	651.8	1,580.8	2,227.9	2,061.7	2,045.3	2,395.8	NA

NA= not available.
1/ Excludes intra-EC trade. Artificially assumes 12 EC members for entire period.

Turkey (2), and Chile (1). Other exporters include East Germany, Poland, Argentina, Sweden, and Zimbabwe.

Exports play a much more prominent role for the EC and virtually all other competing exporters than they do for the United States. EC exports of malt to third countries equalled about one-quarter of production during 1985-87. For others, such as Australia, Canada, Chile, Czechoslovakia, Finland, and Uruguay, exports as a share of production were even higher in this period. EC production of malt has been about double that of the United States in the 1980's. Exports seem vital to keeping some European malt producers in business and in using capacity that far exceeds domestic needs. This appears to be the case in many other countries as well.

The EC's average export market share is estimated at about 61 percent so far in the 1980's, down from the 1970's average of about 63 percent. During the 1960's, its share was under 60 percent. Within the EC, all the member states except Greece, Italy, and Spain are important malt exporters. The largest EC exporter is France, followed by Belgium-Luxembourg and the United Kingdom.

Australia is the world's second largest exporter, with exports of 360,000 tons in 1988. In this decade, Australia's average share of the barley malt market has recovered to 17 percent, after dropping to around 14 percent in the 1970's. Exports from Australia peaked in 1981 and then fell through 1985 before export growth resumed. This decline initially was caused by a very poor barley crop in 1982/83, when drought cut production sharply and hurt quality. Australia's exports were further damaged by the decrease in barley malt purchases by Japan—Australia's major customer—in the mid-1980's. Most of the balance of Australia's exports go to the Philippines and other Asian markets.

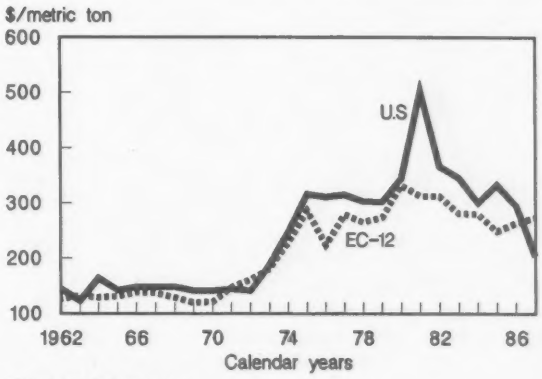
Barley malt is Czechoslovakia's third largest agricultural export, following meat (and meat products) and beer. In 1985-87, its malt exports averaged about 230,000 tons, relatively balanced among six to eight countries. The USSR has traditionally been Czechoslovakia's largest market, followed by Japan and Cuba (which often alternate as the next largest). East Germany, Switzerland, and Venezuela are also important destinations.

Canada's malt exports peaked in 1983 at 257,000 tons, but have fallen markedly since. Canada's market share has also fallen from around 16 percent in the 1960's to 10 percent by the 1980's. Exports in 1985-87 averaged only about 156,000 tons per year, but increased to nearly 170,000 tons in 1988. Japan is Canada's leading market, but smaller sales are usually made to the United States and Caribbean markets as well.

Export Pricing

Very little reliable data on barley malt prices are available for either domestic or export malt in most countries. This

Figure B-3
Barley Malt: Average Unit Export Values



Derived from FAO trade data.

scarcity largely results from commercial sensitivities and the lack of an available, public pricing mechanism such as a futures contract. Calculated export unit values were used as a proxy for export prices. Changes in barley malt prices mainly reflect fluctuations in the supply and price of malting barley.

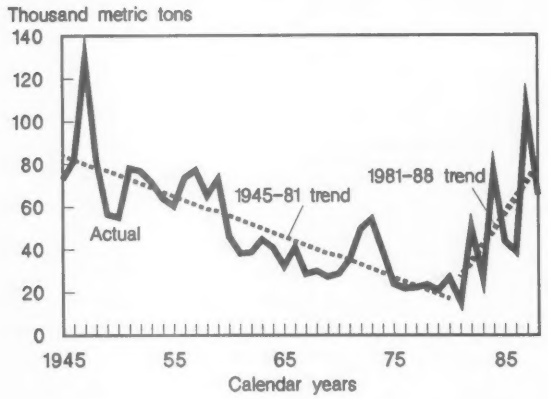
Another factor influencing export prices is the export subsidy provided by the EC. EC maltsters pay more than world prices for malting barley because internal grain prices are supported above world levels. Thus EC malt exporters rely on subsidies, known as export refunds or restitutions, to make malt exports feasible. These are based on refunds for barley times a conversion factor for malt of 1.33. However, they are often accompanied by a premium and subject to various adjustments made by EC officials. Calculated export unit values of U.S. and EC barley malt show that EC prices, until recently, have usually been less than those of the United States (fig. B-3).

U.S. Barley Malt Exports

U.S. barley malt exports peaked in 1947 at 129,000 tons, but then trended downward to a low of about 15,500 tons in 1981 (fig. B-4). U.S. exports averaged about 69,000 tons per year in the 1950's, 37,000 tons in the 1960's, 32,000 tons in the 1970's, and 50,000 tons in the 1980's. The U.S. share of the world market has generally declined since the 1950's. The U.S. share has averaged just over 2 percent in the 1980's, compared with 3 percent in the 1970's and an estimated 6 percent in the 1960's.

The low volume of U.S. shipments in 1981 followed a short barley crop and a sharp jump in U.S. export unit values. That year also marked the widest margin between U.S. and competitor export unit values. Since then, U.S. barley production and supplies have increased significantly, including

Figure B-4
U.S. Barley Malt Exports



a record crop in 1986/87. As U.S. barley and malt prices have declined, U.S. exports have trended upward.

The rebound in U.S. exports also has coincided with a levelling off in domestic use, which has sparked interest in expanding exports still further. Demand for malt in the United States, the largest single-country beer producer, increased steadily from the end of Prohibition in the 1930's until 1980. But in recent years malt use has been flattening out because of a drop in per capita beer and spirits consumption, and greater production of light beers that require less malt to produce the same amount of beer.

By 1984, U.S. exports had risen to over 76,000 tons due to large sales to Japan and the Philippines. U.S. exports dropped in 1985 and 1986 (the first year of EEP sales), increased to nearly 106,000 tons in 1987, and then fell to about 66,000 tons in 1988. EEP sales accounted for an estimated 25-30 percent of U.S. malt exports in 1986, about 75 percent in 1987, and 35-40 percent in 1988. The impact of the barley malt EEP in stimulating U.S. exports is uncertain; a number of countries have not yet purchased against outstanding initiatives (see discussion below).

Traditionally, most U.S. barley malt exports went to Latin American destinations, particularly Venezuela and Colombia. Much of the remainder went to Central America and the Caribbean. However, exports to these markets dropped through the 1960's and 1970's, and sales to Japan increased significantly in the 1970's. During the 1980's, the pattern of U.S. export destinations has been quite sporadic. Leading annual markets for U.S. barley malt exports in the last decade have included Japan, the Philippines, Venezuela, Nigeria, Colombia, and even the United Kingdom.

Effect of the EEP

The EEP was designed to increase the competitiveness of U.S. exports by reducing the export price of selected U.S. commodities sold to targeted markets, thus helping U.S. exporters compete with subsidized sales by other exporters.

The use of the EEP to promote barley malt exports has been relatively minor compared with barley and many other commodities. By value, EEP barley malt sales represented 0.4 percent of all EEP sales and accounted for about $20 million in bonuses (0.8 percent of all EEP bonuses) since the beginning of the entire program in 1985.

Fourteen countries have been targeted for EEP malt sales since early 1986, although only seven have actually made purchases under the program. Some of the purchasers were in the EC's traditional markets, such as Nigeria, Algeria, and Iraq. Other buyers were in Colombia, Honduras, and Guatemala, where the EC had increased its market share at U.S. expense in the late 1960's and early 1970's. In the Philippines, EEP sales helped U.S. exports to continue.

Several other targeted countries have not made purchases under the program, including Burundi, Cameroon, Costa Rica, El Salvador, Peru, and Venezuela. The latter accounted for more than 50 percent of U.S exports through the 1960's, but apparently U.S. exporters have not been able to meet the technical specifications of the Venezuelan market. Since the EEP initiative for Venezuela was announced in September 1986, it has continued to increase purchases from other suppliers.

The largest EEP sales have been to Nigeria, totalling more than 93,000 tons to date, and accounting for all U.S. malt exports to that nation in 1987. Despite the U.S. breakthrough into a traditional EC market, EC exports to Nigeria also increased about 20 percent in 1987. This was an unusual market opportunity that developed under unique circumstances as Nigerian importers rushed to buy as much as they could before the import ban took effect. The Philippines and Colombia have also made large EEP purchases. To date, U.S. maltsters have sold 46,000 tons of barley malt to the Philippines and 40,000 tons to Colombia.

EEP bonuses awarded to U.S. maltsters have covered a wide range (table B-3). This variation reflects several variables, such as the quality of the malt purchased, U.S. prices for barley and malt, the availability of credit, and EC restitutions. In general, bonuses have been higher for more contested markets. Through October 1989, the lowest bonus was $49.60 a ton for a sale to Iraq in August 1989 and the highest $140.02 a ton for a sale to Algeria in April 1988. The latter bonus averaged more than 40 percent of the calculated U.S. export unit value. In contrast, bonuses awarded for the EEP sales to Iraq averaged only 14 percent of the U.S. value of the malt.

Table B-3--EEP barley malt initiatives and sales
June 1986 through November 15, 1989

Date	Country	Initiative Quantity (MT)	Quantity Sold (MT)	Bonus ($/MT)	Sales X Bonus ($)
12/30/87	Algeria	10,000			
4/05/88	Algeria		3,300	140.02	462,066
9/28/89	Brazil	50,000			
12/16/87	Burundi	15,000			
3/25/88	Cameroon	20,000			
4/03/87	Colombia	15,000			
4/05/88	Colombia		15,000	102.00	1,530,000
9/28/89	Colombia	25,000			
10/27/89	Colombia		20,000	136.17	2,723,400
10/31/89	Colombia		5,000	136.17	680,850
1/27/88	Central America Countries (Guatemala, Honduras, El Salvador, Costa Rica)	40,000			
2/22/88	Guatemala		1,000	109.90	109,900
2/22/88	Honduras		500	107.64	53,820
3/04/88	Honduras		500	109.58	54,790
10/13/89	Honduras		2,250	123.85	278,663
Total			4,250	116.98	497,173
12/23/88	Iraq	5,000			
3/24/89	Iraq		1,150	64.97	74,716
4/07/89	Iraq		2,000	60.50	121,000
8/16/89	Iraq		1,200	49.60	59,520
11/15/89	Iraq		650	48.63	31,610
Total			5,000	57.37	286,845
1/10/86	Nigeria	100,000			
6/24/86	Nigeria		4,400	85.00	374,000
12/09/86	Nigeria		5,000	107.00	535,000
12/24/86	Nigeria		2,000	107.00	214,000
1/15/87	Nigeria		4,400	99.98	439,912
2/11/87	Nigeria		3,500	99.99	349,965
3/09/87	Nigeria		4,400	100.00	440,000
5/28/87	Nigeria		64	100.05	6,403
7/02/87	Nigeria		26,400	99.75	2,633,400
7/08/87	Nigeria		5,000	99.73	498,650
8/13/87	Nigeria		3,000	95.75	287,250
8/31/87	Nigeria		5,000	94.91	474,550
9/03/87	Nigeria		2,500	90.91	227,275
9/09/87	Nigeria		5,300	92.85	492,105
9/15/87	Nigeria		8,000	92.85	742,800
9/16/87	Nigeria		1,500	92.85	139,275
10/19/87	Nigeria		3,000	83.92	251,760
10/29/87	Nigeria		3,000	95.06	285,180
10/30/87	Nigeria		5,000	83.92	419,600
11/25/87	Nigeria		2,000	83.90	167,800
Total			93,464	96.07	8,978,925
3/31/88	Peru	20,000			
10/20/86	Philippines	60,000			
10/28/86	Philippines		25,000	102.16	2,554,000
3/04/88	Philippines		15,000	108.51	1,627,650
3/30/88	Philippines		6,000	106.99	641,940
Total			46,000	104.86	4,823,590
9/04/86	Venezuela	100,000			
Total sales and initiatives to date		460,000	192,014	104.07	19,982,849

Current Market Outlook

Barley harvests for 1989/90 in most major producing countries have recently been completed. EC malting barley supplies are relatively tight because of poor growing conditions for its spring barley crops. Unusual heat and dryness cut production and apparently reduced the quality of the grain in some areas. The high protein levels of early samples of EC malting barley indicate reduced suitability for malting. However, it remains unclear whether the damage will jeopardize the EC's malt production and its ability to export.

Although U.S. yields are below average, total barley production will be far greater than last year's drought-reduced harvest. The malting barley situation appears to be better, as indicated by September 1989 prices (Minneapolis, No.3 or better malting barley, 65% plump) running about 95 cents per bushel below a year earlier. However, protein levels are reportedly up. Similarly, Canada's barley production will be up over last year because of recovery from drought, but there will be a below-average amount of malting quality grain.

Alternative supplies of good quality malting barley on the world market may be limited. Australia is a possible source since its crop quality looks good and Australia usually produces a high proportion of malting barley.

Because of limited data, implications for the world barley malt market are not completely clear. Prospects of tighter EC supplies may have increased uncertainty about world malt trade, since little malt is apparently produced in advance of market commitments. However, recent information indicates that the EC will have little or no difficulty with its export program this year.

Appendix table 1--Feed grains: Marketing year supply and disappearanc

Year 2/	Supply				
	Begin-ning stocks	Produc-tion	Imports	Total	Foo alcohol, industr
1984/85	39.6	236.9	0.8	277.3	30.6
1985/86	57.5	274.4	0.9	332.7	33.5
1986/87	126.3	252.3	0.7	379.4	34.3
1987/88	152.1	215.4	1.1	368.6	35.6
1988/89 4/	133.6	149.2	1.4	284.3	36.3
1989/90 5/	65.9	223.0	1.2	290.0	-

	Area		
	Set-aside and diverted	Planted	Har g
	Million hectares		
1984/85	2.1	49.5	4
1985/86	2.9	51.8	4
1986/87	7.3	48.5	4
1987/88	12.5	43.1	3
1988/89	11.1	41.2	3
1989/90	6.3	42.7	3

1/ Aggregated data on corn, sorghum, barley, and oats. 2/ The mark barley, June 1. 3/ Includes total Government loans (original and re 7/ Deficiency payments. 8/ Deficiency and diversion payments.

earance, area, and prices, 1984/85-1989/90 1/

Disappearance						Ending stocks		
Domestic use								
Food, ohol, and dustrial	Seed	Feed and residual	Total	Exports	Total disap-pearance	Govt. owned	Privately owned 3/	Total
Million metric tons								
30.6	1.5	131.1	163.2	56.6	219.8	8.9	48.6	57.5
33.5	1.5	134.8	169.8	36.6	206.4	20.4	105.9	126.3
34.3	1.2	145.5	181.0	46.3	227.3	48.8	103.3	152.1
35.6	1.2	145.5	182.3	52.6	234.9	34.1	99.5	133.6
36.3	1.3	118.8	156.3	62.1	218.4	18.6	47.3	65.9
---38.3---		127.9	166.2	62.8	229.0	26.9	34.1	61.0

Harvested for grain	Yield per harvested hectare	Index Average price received by farmers 6/	Government-support program Total payments to participants
	Metric tons	1977=100	$ million
43.2	5.48	130	7/ 1,860
45.1	6.07	108	7/ 2,785
41.3	6.11	78	8/ 7,343
35.1	6.14	97	8/ 8,928
32.6	4.58	133	8/ 3,240
36.7	6.08	111	7/ 5,560

e marketing year for corn and sorghum begins September 1; for oats and
nd reseal). 4/ Preliminary. 5/ Projected. 6/ Excludes support payments.

Appendix table 2--Foreign coarse grains: Supply and disappearance, 1980/81-1989/90 1/

Year	Beginning stocks	Production	Feed	Total Disappearance	Imports	Adjusted imports 2/	Ending stocks
			Million metric tons				
Corn:							
1980/81	45.8	240.1	168.4	298.0	79.1	78.1	48.9
1981/82	48.9	235.1	175.9	291.3	77.6	67.3	43.8
1982/83	43.8	230.3	174.6	281.5	73.2	63.3	39.1
1983/84	39.1	241.4	167.7	288.9	64.9	61.1	39.8
1984/85	39.8	263.9	183.6	303.6	72.5	66.6	47.4
1985/86	47.4	254.3	186.2	291.7	62.1	54.5	41.2
1986/87	41.2	268.4	195.3	310.5	61.1	56.4	37.2
1987/88	37.2	267.7	195.7	310.7	62.8	56.7	38.1
1988/89 3/	38.1	274.1	212.3	326.0	73.6	63.5	38.4
1989/90 4/	38.4	274.9	219.9	333.9	74.8	69.7	33.9
Sorghum:							
1980/81	6.9	44.6	23.3	49.3	12.8	14.1	8.1
1981/82	8.1	48.1	28.5	55.7	14.3	13.7	7.4
1982/83	7.4	44.0	25.2	51.1	12.3	11.6	6.1
1983/84	6.1	46.5	25.7	52.8	13.1	13.0	6.5
1984/85	6.5	44.0	26.1	52.0	12.9	13.1	6.0
1985/86	6.0	41.9	24.9	48.2	9.6	8.7	5.0
1986/87	5.0	40.6	23.3	46.4	8.1	8.0	4.2
1987/88	4.2	37.4	22.5	44.7	8.6	8.2	3.0
1988/89 3/	3.0	40.1	24.5	48.5	11.0	10.9	4.2
1989/90 4/	4.2	41.8	23.5	47.8	9.5	9.1	4.7
Barley:							
1980/81	16.9	155.4	107.5	156.0	16.3	13.8	17.1
1981/82	17.1	144.9	105.4	149.6	20.4	13.9	14.4
1982/83	14.4	155.6	107.8	152.9	17.2	13.1	17.9
1983/84	17.9	153.6	115.4	159.3	20.3	16.4	12.9
1984/85	12.9	162.5	115.8	158.1	23.1	17.9	19.1
1985/86	19.1	165.1	120.3	162.6	22.3	18.2	22.6
1986/87	22.6	169.1	125.7	168.0	24.1	18.4	26.7
1987/88	26.7	169.1	126.7	173.1	20.7	15.8	25.3
1988/89 3/	25.3	160.6	120.1	163.1	21.1	17.6	24.7
1989/90 4/	24.7	160.1	123.6	167.8	21.5	17.3	21.5
Total coarse grains: 5/							
1980/81	77.4	534.0	342.0	600.3	110.3	108.1	81.5
1981/82	81.5	520.3	351.7	588.6	114.5	97.5	72.8
1982/83	72.8	533.6	357.2	585.8	104.0	89.5	73.2
1983/84	73.2	550.9	364.5	609.2	100.2	92.8	70.8
1984/85	70.8	578.1	377.3	618.8	111.2	99.6	85.9
1985/86	85.9	568.4	387.4	608.7	95.8	82.2	81.2
1986/87	81.2	582.7	396.9	628.0	95.2	83.5	81.4
1987/88	81.4	575.8	397.0	629.5	94.0	82.0	79.3
1988/89 3/	79.3	579.5	406.3	640.1	107.3	92.9	79.4
1989/90 4/	79.4	584.5	420.6	653.0	107.6	98.1	72.6

1/ Aggregated on basis of local marketing years, except for adjusted imports. 2/ Based on Oct./Sept. trade year and excludes intra-EC trade. 3/ Preliminary. 4/ Forecast. 5/ Includes oats, rye, millet, and mixed grains.

Source: Compiled from World Grain Situation and Outlook, Foreign Agricultural Service, and USDA data.

Appendix table 3--Corn: Marketing year supply and disappearance, area, and p

Year beginning September 1	Supply				Dom	
	Begin-ning stocks	Produc-tion	Imports	Total	Food, alcohol, and industrial	S
					Mil	
1984/85	1,006.3	7,674.0	3.5	8,683.8	1,070.0	2
1985/86	1,648.2	8,876.7	10.6	10,535.5	1,140.0	1
1986/87	4,039.5	8,249.9	2.1	12,291.5	1,175.0	1
1987/88	4,881.7	7,072.1	4.0	11,957.8	1,212.0	1
1988/89 2/	4,259.1	4,921.2	5.0	9,185.3	1,226.4	1
1989/90 3/	1,930.4	7,589.7	3.0	9,523.1	---1,275.0--	

	Area			Yield per harvested acre	Received by farmers 4
	Set-aside and diverted	Planted	Harvested for grain		
	Million acres			Bushels	
1984/85	3.9	80.5	71.9	106.7	2.63
1985/86	5.4	83.4	75.2	118.0	2.23
1986/87	14.3	76.7	69.2	119.3	1.50
1987/88	23.0	65.7	59.2	119.5	1.94
1988/89	20.5	67.6	58.2	84.6	2.54
1989/90	10.1	72.3	65.1	116.6	2.00-2.40

1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary.
5/ Deficiency payments. 6/ Deficiency and diversion payments. 7/ Deficiency

and prices, 1984/85-1989/90

	Disappearance					Ending stocks Aug. 31		
	Domestic use							
nd	Seed	Feed and residual	Total	Exports	Total disappearance	Govt. owned	Privately owned 1/	Total
	Million bushels							
	21.2	4,079.0	5,170.2	1,865.4	7,035.6	224.9	1,423.3	1,648.2
	19.5	4,095.3	5,254.8	1,241.2	6,496.0	545.7	3,493.8	4,039.5
	16.7	4,713.7	5,905.4	1,504.4	7,409.8	1,443.2	3,438.5	4,881.7
	17.2	4,735.0	5,964.2	1,734.5	7,698.7	835.0	3,424.1	4,259.1
	18.7	3,949.6	5,194.7	2,060.2	7,254.9	400.0	1,530.4	1,930.4
75.6---		4,200.0	5,475.0	2,150.0	7,625.0	750.0	1,148.1	1,898.1

	Average prices				Government-support program		
ceived by mers 4/	St. Louis No. 2 yellow	Omaha No. 2 yellow	Gulf Ports No. 2 yellow	National average loan rate	Target price	Total payments to parcicipants
	$/bu.					$ million
2.63	2.81	2.65	3.00	2.55	3.03	5/ 1,654
2.23	2.37	2.25	2.52	2.55	3.03	5/ 2,479
1.50	1.68	1.53	1.83	1.92	3.03	6/ 6,213
1.94	2.19	1.98	2.38	1.82	3.03	6/ 7,321
2.54	2.73	2.49	2.93	1.77	2.93	7/ 3,769
0-2.40				1.65	2.84	

ary. 3/ Projected. 4/ Excludes support payments.
ciency, diversion, and disaster payments.

Appendix table 4--Sorghum: Marketing year supply and disappearance, area, an

Year beginning September 1	Supply				Dis	
	Beginning stocks	Production	Imports	Total	Food, alcohol, and industrial	S
						Mil
1984/85	287.4	866.2	0.1	1,153.7	15.3	
1985/86	300.2	1,120.3	---	1,420.5	26.0	
1986/87	551.0	938.1	---	1,489.1	10.4	
1987/88	743.3	739.2	---	1,482.5	23.5	
1988/89 2/	662.7	577.6	---	1,240.3	20.5	
1989/90 3/	438.0	628.9	---	1,066.9	13.5	

	Area			Yield per harvested acre	
	Set-aside and diverted	Planted	Harvested for grain		Received by farmers 4
	Million acres			Bushels	
1984/85	0.6	17.3	15.4	56.4	4.15
1985/86	0.9	18.3	16.8	66.8	3.45
1986/87	2.3	15.3	13.9	67.7	2.45
1987/88	4.1	11.8	10.6	69.7	3.04
1988/89	3.9	10.4	9.1	63.8	4.05
1989/90	2.9	11.9	10.5	59.8	3.30-4.0

--- = Not applicable.
1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary.
5/ Deficiency payments. 6/ Deficiency and diversion payments. 7/ Deficiency

a, and prices, 1984/85-1989/90

Disappearance					Ending stocks Aug. 31		
Domestic use			Exports	Total disappearance	Govt. owned	Privately owned 1/	Total
Seed	Feed and residual	Total					
Million bushels							
2.0	539.3	556.6	296.9	853.5	112.1	188.1	300.2
1.7	663.8	691.5	178.0	869.5	207.2	343.8	551.0
1.5	535.6	547.5	198.3	745.8	409.0	334.3	743.3
1.3	563.7	588.5	231.3	819.8	463.6	199.1	662.7
1.5	470.4	492.4	309.9	834.8	362.5	75.5	438.0
1.4	500.3	515.0	250.0	765.0	275.0	26.9	301.9

Average prices				Government-support program		
eived by ers 4/	Kansas City No. 2 yellow	Texas No. 2 yellow	Gulf Ports No. 2 yellow	National average loan rate	Target price	Total payments to participants
			$/cwt.			$ million
.15	4.46	5.04	4.90	4.32	5.14	5/ 158
.45	3.72	4.32	4.07	4.32	5.14	5/ 228
.45	2.73	3.24	3.22	3.25	5.14	6/ 585
.04	3.40	3.81	3.96	3.11	5.14	6/ 699
.05	4.17	4.66	4.81	3.00	4.96	7/ 363
0-4.02						

nary. 3/ Projected. 4/ Excludes support payments.
ciency, diversion and disaster payments.

Appendix table 5--Barley: Marketing year supply and disappearance, area, and pr

Year beginning June 1	Supply				Dome	
	Begin-ning stocks	Produc-tion	Imports	Total	Food, alcohol, and industrial	Seed
					Millio	
1984/85	189.4	599.2	10.1	798.7	149.0	21.4
1985/86	247.4	591.4	8.9	848.8	147.2	21.3
1986/87	324.8	610.5	8.7	944.0	156.1	17.9
1987/88	335.6	529.5	13.6	878.7	158.3	15.7
1988/89 2/	321.2	293.5	11.8	626.5	165.7	15.0
1989/90 3/	196.5	404.6	15.0	616.6	165.0	15.0

	Area			Yield per harvested acre	
	Set-aside and diverted	Planted	Harvested for grain		Received by farmers 4/
	Million acres			Bushels	
1984/85	0.5	12.0	11.2	53.4	2.29
1985/86	0.7	13.2	11.6	51.0	1.98
1986/87	1.8	13.1	12.0	50.8	1.61
1987/88	2.9	11.0	10.1	52.6	1.81
1988/89	2.8	9.7	7.5	38.6	2.79
1989/90	2.2	9.2	8.3	48.5	2.35-2.55

1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary. 3
March 1987, shifted to Duluth. 6/ Deficiency payments. 7/ Deficiency and dive

nd prices, 1984/85-1989/90

Disappearance					Ending stocks May 31		
--Domestic use----------							
Seed	Feed and residual	Total	Exports	Total disap-pearance	Govt. owned	Privately owned 1/	Total
Million bushels							
21.4	304.1	474.5	76.8	551.3	15.6	231.8	247.4
21.3	332.6	501.1	21.8	522.9	57.4	267.4	324.8
17.9	297.8	471.8	136.6	608.4	75.5	260.1	335.6
15.7	258.0	432.0	126.1	558.1	50.1	271.1	321.2
15.0	165.7	345.4	84.6	430.0	30.4	166.1	196.5
15.0	190.0	370.1	85.0	455.1	40.0	121.0	161.0

Average prices				Government-support program		
	Minneapolis		Portland			
ved s 4/	No. 2 or better feed 5/	No. 3 or better malting	No. 2	National average loan rate	Target price	Total payments to participants
$/bu.						$ million
9	2.09	2.55	2.59	2.08	2.60	6/ 50
8	1.53	2.24	2.23	2.08	2.60	6/ 160
1	1.44	1.89	1.97	1.56	2.60	7/ 356
1	1.78	2.04	2.09	1.49	2.60	7/ 333
9	2.31	4.11	2.74	1.44	2.51	8/ 180
.55				1.34	2.43	

y. 3/ Projected. 4/ Excludes support payments. 5/ Starting
diversion payments. 8/ Deficiency, diversion and disaster payments.

Appendix table 6--Oats: Marketing year supply and disappearance, area, and prices, 19

Year beginning June 1	Supply				Domestic us	
	Beginning stocks	Production	Imports	Total	Food, alcohol, and industrial	Seed
					Million bush	
1984/85	181.1	473.7	34.0	688.8	41.0	34.6
1985/86	179.9	520.8	27.5	728.2	44.0	38.4
1986/87	183.7	386.4	33.3	603.4	45.0	30.6
1987/88	132.7	374.0	46.3	553.0	45.0	34.0
1988/89 2/	112.0	218.9	68.4	399.3	70.4	29.6
1989/90 3/	98.3	370.7	55.0	524.0	---110.0---	

	Area			Yield per harvested acre		Minnea
	Set-aside and diverted	Planted	Harvested for grain		Received by farmers 4/	No. whi hea
	Million acres			Bushels		
1984/85	0.1	12.4	8.2	58.0	1.67	1.
1985/86	0.1	13.3	8.2	63.7	1.23	1.
1986/87	0.4	14.7	6.9	56.0	1.21	1.
1987/88	0.8	18.0	6.9	54.0	1.56	1.
1988/89	0.3	13.9	5.6	39.2	2.61	2.
1989/90	0.3	12.1	6.8	54.3	1.40-1.60	

NA = Not available.
1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary. 3/ Proj
6/ Deficiency and diversion payments. 7/ Deficiency, diversion and disaster payments

es, 1984/85-1989/90

Disappearance				Ending stocks May 31		
tic use						
Feed and residual	Total	Exports	Total disappearance	Govt. owned	Privately owned 1/	Total
n bushels						
432.0	507.6	1.3	508.9	1.4	178.5	179.9
459.9	542.3	2.2	544.5	1.9	181.8	183.7
392.3	467.9	2.8	470.7	3.5	129.2	132.7
360.5	439.5	1.5	441.0	3.5	108.5	112.0
199.6	299.6	1.3	300.9	2.0	96.3	98.3
300.0	410.0	2.0	412.0	0.0	112.0	112.0

Average prices			Government-support program		
inneapolis No. 2 white, heavy	Portland No. 2 white, heavy	Toledo No. 2	National average loan rate	Target price	Total payments to participants
$/bu.					$ million
1.81	2.12	1.92	1.31	1.60	NA
1.31	1.60	1.08	1.31	1.60	5/ 8
1.46	1.53	1.20	0.99	1.60	6/ 34
1.92	1.76	1.68	0.94	1.60	6/ 27
2.80	2.24	2.26	0.90	1.55	7/ 40
			0.85	1.50	

/ Projected. 4/ Excludes support payments. 5/ Deficiency payments.
yments.

Appendix table 7--Corn: Marketing year supply and disappearance, specified pe

Year beginning September 1	Supply				Domestic	
	Beginning stocks	Production	Imports	Total	Food, alcohol, and industrial	Seed
						Million b
1983/84:						
Sept.-Nov.	3,523.1	4,174.7	0.5	7,698.3	238.6	---
Dec.-Feb.	5,651.7	---	0.6	5,652.3	222.8	---
Mar.-May	3,865.0	---	1.0	3,866.0	247.3	16.8
June-Aug.	2,145.1	---	0.6	2,145.7	247.3	2.3
Mkt. year	3,523.1	4,174.7	2.7	7,700.5	956.0	19.1
1984/85:						
Sept.-Nov.	1,006.3	7,674.0	0.9	8,681.2	249.7	---
Dec.-Feb.	6,631.1	---	0.4	6,631.5	241.5	---
Mar.-May	4,623.2	---	1.1	4,624.3	283.8	17.0
June-Aug.	2,835.5	---	1.1	2,836.6	295.0	4.2
Mkt. year	1,006.3	7,674.0	3.5	8,683.8	1,070.0	21.2
1985/86:						
Sept.-Nov.	1,648.2	8,876.7	1.0	10,525.9	278.0	---
Dec.-Feb.	8,614.7	---	1.3	8,616.0	264.0	---
Mar.-May	6,587.1	---	2.3	6,589.4	293.0	16.1
June-Aug.	4,990.0	---	6.0	4,996.0	305.0	3.4
Mkt. year	1,648.2	8,876.7	10.6	10,535.5	1,140.0	19.5
1986/87:						
Sept.-Nov.	4,039.5	8,249.9	0.8	12,290.2	280.0	---
Dec.-Feb.	10,305.5	---	0.3	10,305.8	270.0	---
Mar.-May	8,248.2	---	0.5	8,248.7	310.0	16.4
June-Aug.	6,332.2	---	0.5	6,332.7	315.0	0.3
Mkt. year	4,039.5	8,249.9	2.1	12,291.5	1,175.0	16.7
1987/88:						
Sept.-Nov.	4,881.7	7,072.1	0.6	11,954.4	292.0	---
Dec.-Feb.	9,771.0	---	0.9	9,771.9	282.0	---
Mar.-May	7,635.6	---	1.6	7,637.2	315.0	16.7
June-Aug.	5,835.5	---	0.9	5,836.4	323.0	0.5
Mkt. year 2/	4,881.7	7,072.1	4.0	11,957.8	1,212.0	17.2
1988/89:						
Sept.-Nov.	4,259.1	4,921.2	0.7	9,181.0	294.0	---
Dec.-Feb.	7,071.6	---	1.5	7,073.1	284.0	---
Mar.-May	5,203.9	---	1.9	5,205.8	320.2	16.8
June-Aug.	3,419.3	---	0.9	3,420.2	328.2	1.9
Mkt. year 2/	4,259.1	4,921.2	5.0	9,185.3	1,226.3	18.7
1989/90:						
Mkt. year 3/	1,930.4	7,589.7	3.0	9,523.1	---1,275.0---	

--- = Not applicable.
1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary.

ed periods, 1983/84-1989/90

Disappearance					Ending stocks		
estic use							
eed	Feed and residual	Total	Exports	Total disappearance	Govt. owned	Privately owned 1/	Total
ion bushels							
---	1,311.0	1,549.6	497.0	2,046.6	227.0	4,424.7	5,651.7
---	1,056.0	1,278.8	508.5	1,787.3	214.0	2,651.0	3,865.0
6.8	939.5	1,203.6	517.3	1,720.9	195.0	1,950.1	2,145.1
2.3	511.1	760.7	378.7	1,139.4	201.5	804.8	1,006.3
9.1	3,817.6	4,792.7	1,901.5	6,694.2	201.5	804.8	1,006.3
---	1,294.2	1,543.9	506.2	2,050.1	206.7	6,424.4	6,631.1
---	1,182.9	1,424.4	583.9	2,008.3	209.7	4,413.5	4,623.2
7.0	1,009.1	1,309.9	478.9	1,788.8	221.7	2,613.8	2,835.5
4.2	592.8	892.0	296.4	1,188.4	224.9	1,423.3	1,648.2
1.2	4,079.0	5,170.2	1,865.4	7,035.6	224.9	1,423.3	1,648.2
---	1,215.5	1,493.5	417.7	1,911.2	388.6	8,226.1	8,614.7
---	1,299.6	1,563.6	465.3	2,028.9	509.4	6,077.7	6,587.1
6.1	1,085.9	1,395.0	204.4	1,599.4	550.9	4,439.1	4,990.0
3.4	494.3	802.7	153.8	956.5	545.7	3,493.8	4,039.5
9.5	4,095.3	5,254.8	1,241.2	6,496.0	545.7	3,493.8	4,039.5
---	1,384.6	1,663.6	321.1	1,984.7	968.2	9,337.3	10,305.5
---	1,472.2	1,742.2	315.4	2,057.6	1,362.2	6,886.0	8,248.2
6.4	1,089.9	1,416.3	500.2	1,916.5	1,491.5	4,840.7	6,332.2
0.3	768.0	1,083.3	367.7	1,451.0	1,443.2	3,438.5	4,881.7
6.7	4,713.7	5,905.4	1,504.4	7,409.8	1,443.2	3,438.5	4,881.7
---	1,493.4	1,785.4	398.0	2,183.4	1,683.4	8,087.6	9,771.0
---	1,446.0	1,728.0	408.3	2,136.3	1,767.7	5,867.9	7,635.6
6.7	956.2	1,287.9	513.8	1,801.7	1,304.9	4,530.6	5,835.5
0.5	839.4	1,162.9	414.4	1,577.3	835.0	3,424.1	4,259.1
7.2	4,735.0	5,964.2	1,734.5	7,698.7	835.0	3,424.1	4,259.1
---	1,333.5	1,627.5	481.9	2,109.4	611.0	6,460.6	7,071.6
---	1,076.9	1,360.9	508.3	1,869.2	465.0	4,738.9	5,203.9
6.8	849.3	1,186.3	600.2	1,786.5	417.7	3,001.6	3,419.3
1.9	689.9	1,020.0	468.9	1,498.8	400.0	1,530.4	1,930.4
8.7	3,949.6	5,194.7	2,060.2	7,254.9	400.0	1,530.4	1,930.4
--	4,200.0	5,475.0	2,150.0	7,625.0	750.0	1,148.1	1,898.1

ary. 3/ Projected.

Appendix table 8--Sorghum: Marketing year supply and disappearance, specified pe

Year beginning September 1	Supply				Dome	
	Begin-ning stocks	Produc-tion	Imports	Total	Food, alcohol, and industrial	Seed
					Million b	
1982/83:						
Sept.-May	318.6	835.1	0.0	1,153.7	6.0	0.9
June-Aug.	529.1	0.0	0.0	529.1	1.9	0.9
Mkt. year	318.6	835.1	0.0	1,153.7	7.9	1.8
1983/84:						
Sept.-May	439.1	487.5	0.0	926.6	5.7	1.1
June-Aug.	368.9	0.0	0.1	369.0	2.0	1.2
Mkt. year	439.1	487.5	0.1	926.7	7.7	2.3
1984/85:						
Sept.-May	287.4	866.2	0.1	1,153.7	12.4	1.5
June-Aug.	360.8	0.0	0.0	360.8	2.9	0.5
Mkt. year	287.4	866.2	0.1	1,153.7	15.3	2.0
1985/86:						
Sept.-May	300.2	1,120.3	0.0	1,420.5	22.1	1.2
June-Aug.	630.0	0.0	0.0	630.0	3.9	0.5
Mkt. year	300.2	1,120.3	0.0	1,420.5	26.0	1.7
1986/87:						
Sept.-May	551.0	938.1	0.0	1,489.1	8.2	1.0
June-Aug.	835.0	0.0	0.0	835.0	2.2	0.5
Mkt. year	551.0	938.1	0.0	1,489.1	10.4	1.5
1987/88:						
Sept.-May	743.3	739.2	0.0	1,482.5	14.2	0.8
June-Aug.	807.8	0.0	0.0	807.8	9.3	0.5
Mkt. year 2/	743.3	739.2	0.0	1,482.5	23.5	1.3
1988/89:						
Sept.-May	662.7	577.6	0.0	1,240.3	17.0	0.8
June-Aug.	558.5	0.0	0.0	558.5	3.5	0.7
Mkt. year 3/	662.7	577.6	0.0	1,240.3	20.5	1.5
1989/90:						
Mkt. year 3/	438.0	628.9	0.0	1,066.9	---15.0---	

1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary. 3/

ied periods, 1982/83-1989/90

Disappearance					Ending stocks		
--Domestic use----------							
Seed	Feed and residual	Total	Exports	Total disap-pearance	Govt. owned	Privately owned 1/	Total
ion bushels							
0.9	453.5	460.4	164.2	642.6	54.0	475.1	529.1
0.9	41.3	44.1	45.9	90.0	171.5	267.6	439.1
1.8	494.8	504.5	210.1	714.6	171.5	267.6	439.1
1.1	356.5	363.3	194.4	557.7	78.0	290.9	368.9
1.2	28.2	31.4	50.2	81.6	102.8	184.6	287.4
2.3	384.7	394.7	244.6	639.3	102.8	184.6	287.4
1.5	542.2	556.1	236.8	792.9	111.1	249.7	360.8
0.5	(2.9)	0.5	60.1	60.6	112.1	188.1	300.2
2.0	539.3	556.6	296.9	853.5	112.1	188.1	300.2
1.2	626.9	650.2	140.3	790.5	181.4	447.5	630.0
0.5	36.9	41.3	37.7	79.0	207.2	343.8	551.0
1.7	663.8	691.5	178.0	869.5	207.2	343.8	551.0
1.0	490.1	499.3	154.8	654.1	400.4	434.6	835.0
0.5	45.5	48.2	43.5	91.7	409.0	334.3	743.3
1.5	535.6	547.5	198.3	745.8	409.0	334.3	743.3
0.8	474.4	489.4	185.3	674.7	535.0	272.8	807.8
0.5	89.3	99.1	46.0	145.1	463.6	199.1	662.7
1.3	563.7	588.5	231.3	819.8	463.6	199.1	662.7
0.8	426.2	444.0	237.8	681.8	463.6	94.9	558.5
0.7	44.2	48.4	72.1	120.5	340.9	97.1	438.0
1.5	470.4	492.4	309.9	802.3	340.9	97.1	438.0
0---	500.0	515.0	250.0	765.0	275.0	26.9	301.9

. 3/ Projected.

Appendix table 9--Barley: Marketing year supply and disappearance, specified periods

Year beginning September 1	Supply				D		
	Beginning stocks	Production	Imports	Total	Domestic use		Fe and resi
					Food, alcohol, and industrial	Seed	
	Million bushels						
1983/84:							
June-Aug.	216.7	508.9	2.8	728.4	42.5	0.0	
Sept.-Nov.	---	---	1.4	1.4	35.0	1.4	
Dec.-Feb.	---	---	1.5	1.5	34.6	1.6	
Mar.-May	---	---	1.4	1.4	40.0	16.5	
Mkt. year	216.7	508.9	7.1	732.7	152.1	19.5	
1984/85:							
June-Aug.	189.4	599.2	3.1	791.7	39.9	0.0	
Sept.-Nov.	639.0	---	1.6	640.6	34.6	1.5	
Dec.-Feb.	484.9	---	3.2	488.1	34.2	1.7	
Mar.-May	358.7	---	2.2	360.9	40.3	18.2	
Mkt. year	189.4	599.2	10.1	798.7	149.0	21.4	
1985/86:							
June-Aug.	247.4	591.4	1.4	840.2	39.1	0.0	
Sept.-Nov.	698.3	---	2.0	700.3	33.7	1.5	
Dec.-Feb.	572.1	---	3.2	575.3	33.7	1.7	
Mar.-May	464.7	---	2.3	467.0	40.7	18.1	
Mkt. year	247.4	591.4	8.9	847.7	147.2	21.3	
1986/87:							
June-Aug.	324.8	610.5	1.9	937.2	42.2	0.0	
Sept.-Nov.	786.8	---	1.7	788.5	36.5	1.3	
Dec.-Feb.	634.3	---	1.8	636.1	35.8	1.4	
Mar.-May	499.3	---	3.3	502.6	41.6	15.2	
Mkt. year	324.8	610.5	8.7	944.0	156.1	17.9	
1987/88:							
June-Aug.	335.6	529.5	1.5	866.6	42.8	0.0	
Sept.-Nov.	725.0	---	3.8	728.8	37.1	1.1	
Dec.-Feb.	582.4	---	5.0	587.4	36.3	1.3	
Mar.-May	458.5	---	3.3	461.8	42.1	13.3	
Mkt. year 2/	335.6	529.5	13.6	878.7	158.3	15.7	
1988/89:							
June-Aug.	321.2	293.5	3.1	617.8	45.2	0.0	
Sept.-Nov.	450.7	---	2.6	453.3	39.4	1.1	
Dec.-Feb.	372.4	---	3.1	375.5	37.2	1.2	
Mar.-May	280.8	---	2.9	283.7	42.9	12.7	
Mkt. year 1/	321.2	293.5	11.8	626.5	164.7	15.0	
1989/90:							
June-Aug.	196.5	404.6	3.9	605.0	45.0	0.0	
Mkt. year 2/	196.5	404.6	15.0	616.1	165.0	15.0	

--- = Not applicable.
1/ Preliminary. 2/ Projected.

eriods, 1983/84-1989/90

Disappearance				Ending stocks		
use						
Feed and residual	Total	Exports	Total disappearance	Govt. owned	Privately owned 1/	Total
shels						
100.2	142.7	9.2	151.9	8.5	568.0	576.5
88.1	124.5	31.4	155.9	10.7	411.3	422.0
49.6	85.8	29.5	115.3	12.0	296.2	308.2
42.4	98.9	21.3	120.2	11.9	177.5	189.4
280.3	451.9	91.4	543.3	11.9	177.5	189.4
100.6	140.5	12.2	152.7	12.2	626.8	639.0
83.2	119.3	36.4	155.7	13.0	471.9	484.9
69.9	105.8	23.6	129.4	14.2	344.5	358.7
50.4	108.9	4.6	113.5	15.6	231.8	247.4
304.1	474.5	76.8	551.3	15.6	231.8	247.4
92.0	131.1	10.8	141.9	20.0	678.3	698.3
85.4	120.6	7.6	128.2	36.1	536.0	572.1
73.3	108.7	1.9	110.6	47.3	417.4	464.7
81.9	140.7	1.5	142.2	57.4	267.4	324.8
332.6	501.1	21.8	522.9	57.4	267.4	324.8
93.8	136.0	14.4	150.4	56.0	730.8	786.8
72.6	110.4	43.8	154.2	66.2	568.1	634.3
67.2	104.4	32.4	136.8	75.2	424.1	499.3
64.2	121.0	46.0	167.0	75.5	260.1	335.6
297.8	471.8	136.6	608.4	75.5	260.1	335.6
81.1	123.9	17.7	141.6	74.9	650.1	725.0
62.8	101.0	45.4	146.4	79.5	502.9	582.4
58.1	95.7	33.2	128.9	57.0	401.5	458.5
55.4	110.8	29.8	140.6	50.1	271.1	321.2
257.4	431.4	126.1	557.5	50.1	271.1	321.2
92.2	137.4	26.7	164.1	35.9	414.8	450.7
26.1	66.6	14.3	80.9	35.9	336.5	372.4
40.0	78.4	16.3	94.7	34.1	246.7	280.8
4.2	59.5	29.4	87.2	30.4	166.1	196.5
165.7	345.4	84.6	430.0	30.4	166.1	196.5
113.7	158.7	28.8	187.5	36.6	380.9	417.5
190.1	370.1	85.0	455.1	40.0	121.0	161.0

Appendix table 10--Average prices received by farmers, United States, by month, and loan rate, 1982-1989 1/

Year	Sept	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average 2/	Loan rate
						$/bu.								
Corn:														
1982	2.15	1.98	2.13	2.26	2.36	2.56	2.71	2.95	3.03	3.04	3.13	3.35	2.55	2.55
1983	3.32	3.15	3.17	3.15	3.15	3.11	3.21	3.32	3.34	3.36	3.30	3.12	3.21	2.65
1984	2.90	2.65	2.55	2.56	2.64	2.62	2.67	2.70	2.68	2.64	2.60	2.44	2.63	2.55
1985	2.29	2.11	2.21	2.29	2.33	2.32	2.29	2.30	2.39	2.32	2.00	1.73	2.23	2.55
1986	1.45	1.40	1.47	1.50	1.48	1.42	1.47	1.52	1.66	1.69	1.60	1.47	1.50	1.92
1987	1.49	1.55	1.61	1.72	1.77	1.83	1.86	1.88	1.94	2.41	2.72	2.65	1.94	1.82
1988	2.60	2.58	2.51	2.53	2.60	2.59	2.60	2.56	2.58	2.52	2.47	2.26	2.54	1.77
1989	2.27 3/	2.20												
						$/cwt.								
Sorghum:														
1982	3.80	3.70	3.78	3.97	4.09	4.42	4.67	4.92	5.05	5.05	5.03	5.29	4.41	4.32
1983	5.26	5.01	4.98	4.93	4.92	4.74	4.85	5.00	5.08	4.94	4.64	4.58	4.89	4.50
1984	4.24	4.05	4.05	4.15	4.16	4.10	4.24	4.46	4.54	4.52	4.04	3.74	4.15	4.32
1985	3.27	3.30	3.47	3.76	3.69	3.55	3.67	3.80	3.99	3.43	3.06	2.66	3.45	4.32
1986	2.36	2.34	2.38	2.41	2.37	2.36	2.44	2.58	2.69	2.79	2.66	2.52	2.45	3.25
1987	2.43	2.48	2.69	2.72	2.75	2.88	2.92	2.94	2.91	4.13	4.56	4.41	3.04	3.11
1988	4.26	4.16	3.99	4.07	4.09	4.05	4.04	4.21	4.02	3.90	3.99	3.81	4.05	3.00
1989	3.80 3/	3.61												

Year	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr	May	Average 2/	Loan rate
						$/bu.								
Oats:														
1982	1.88	1.57	1.39	1.35	1.32	1.40	1.44	1.46	1.48	1.49	1.54	1.54	1.49	1.31
1983	1.51	1.46	1.45	1.55	1.62	1.67	1.73	1.81	1.88	1.81	1.82	1.84	1.62	1.36
1984	1.80	1.68	1.62	1.60	1.69	1.64	1.72	1.74	1.69	1.68	1.68	1.60	1.67	1.31
1985	1.59	1.31	1.16	1.10	1.08	1.17	1.20	1.18	1.16	1.14	1.13	1.21	1.23	1.31
1986	1.10	0.90	0.86	0.99	1.10	1.32	1.44	1.46	1.47	1.45	1.50	1.57	1.21	0.99
1987	1.52	1.29	1.40	1.49	1.61	1.62	1.76	1.79	1.84	1.78	1.82	1.84	1.56	0.94
1988	2.63	2.86	2.54	2.57	2.56	2.41	2.47	2.52	2.46	2.41	2.24	2.14	2.61	0.90
1989	1.82	1.53	1.46	1.38 3/	1.40									
All barley:														
1982	2.39	2.16	2.20	2.17	1.98	2.06	2.19	2.16	2.00	2.09	2.22	2.36	2.18	2.08
1983	2.32	2.20	2.34	2.46	2.53	2.55	2.55	2.55	2.47	2.50	2.54	2.78	2.47	2.16
1984	2.61	2.54	2.26	2.25	2.29	2.25	2.19	2.24	2.21	2.18	2.16	2.22	2.29	2.08
1985	2.14	2.08	1.98	1.88	1.96	2.05	2.07	2.05	1.95	1.88	1.85	1.73	1.98	2.08
1986	1.57	1.67	1.51	1.45	1.58	1.69	1.62	1.60	1.63	1.69	1.69	1.76	1.61	1.56
1987	1.74	1.84	2.00	1.87	1.73	1.88	1.83	1.78	1.72	1.65	1.74	1.79	1.81	1.49
1988	2.45	2.97	2.96	2.94	2.86	2.96	2.73	2.74	2.66	2.74	2.73	2.63	2.79	1.44
1989	2.33	2.15	2.30	2.47 3/	2.32									

Year	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
						$/bu.						
Feed barley:												
1982	2.52	2.23	1.98	1.91	1.87	1.94	1.98	2.07	1.99	2.08	2.26	2.43
1983	2.52	2.31	2.23	2.41	2.45	2.51	2.52	2.58	2.47	2.54	2.55	2.86
1984	2.72	2.60	2.10	2.13	2.19	2.19	2.20	2.22	2.27	2.19	2.16	2.30
1985	2.26	2.05	1.75	1.74	1.85	1.90	2.03	2.00	1.90	1.83	1.85	1.81
1986	1.61	1.44	1.21	1.33	1.49	1.62	1.59	1.56	1.61	1.69	1.71	1.84
1987	1.79	1.67	1.54	1.57	1.66	1.68	1.63	1.65	1.64	1.59	1.73	1.76
1988	2.07	2.34	2.37	2.39	2.34	2.30	2.27	2.29	2.34	2.35	2.32	2.27
1989	2.14	1.94	2.03	1.98 3/	2.00							
Malting barley:												
1982	2.26	2.10	2.38	2.58	2.22	2.26	2.39	2.32	2.00	2.09	2.13	2.18
1983	2.05	2.06	2.50	2.69	2.72	2.61	2.61	2.50	2.47	2.46	2.54	2.53
1984	2.52	2.48	2.50	2.52	2.52	2.39	2.18	2.29	2.11	2.17	2.17	2.10
1985	2.02	2.13	2.49	2.33	2.24	2.32	2.19	2.13	1.99	1.93	1.85	1.66
1986	1.52	2.07	2.23	1.85	1.83	1.78	1.65	1.70	1.69	1.69	1.65	1.66
1987	1.68	2.04	2.55	2.39	1.88	2.07	2.01	2.15	1.80	1.69	1.76	1.81
1988	2.80	3.27	3.37	3.44	3.41	3.34	3.27	3.24	3.22	3.22	3.16	3.04
1989	2.62	2.67	3.06	2.87 3/	2.87							

1/ Prices do not include an allowance for loans outstanding and Government purchases. 2/ U.S. season average prices based on monthly prices weighted by monthly marketings. 3/ Preliminary.

Source: Agricultural Prices, Agricultural Statistics Board, USDA.

Appendix table 11--Cash prices at principal markets, 1985-1989

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
						$/bu.							
Corn, no. 2 yellow, Central Illinois:													
1985	2.28	2.10	2.32	2.36	2.36	2.33	2.29	2.31	2.42	2.41	1.93	1.52	2.22
1986	1.34	1.34	1.55	1.52	1.44	1.38	1.46	1.56	1.75	1.74	1.60	1.46	1.51
1987	1.50	1.64	1.74	1.78	1.84	1.90	1.92	1.92	1.97	2.66	2.85	2.70	2.04
1988	2.68	2.70	2.54	2.58	2.62	2.60	2.64	2.58	2.64	2.54	2.44	2.30	2.57
1989	2.33												
Corn, no. 2 yellow, Gulf Ports:													
1985	2.59	2.50	2.69	2.75	2.72	2.63	2.56	2.57	2.68	2.63	2.12	1.85	2.52
1986	1.68	1.66	1.83	1.81	1.73	1.70	1.83	1.89	2.06	2.06	1.95	1.81	1.83
1987	1.86	1.99	2.08	2.11	2.20	2.23	2.29	2.28	2.29	3.05	3.22	3.02	2.38
1988	3.08	3.07	2.89	2.99	3.01	2.99	3.02	2.93	2.99	2.87	2.73	2.57	2.93
1989	2.62												
Corn, no. 2 yellow, St. Louis:													
1985	2.38	2.27	2.50	2.59	2.55	2.50	2.42	2.46	2.56	2.52	2.01	1.67	2.37
1986	1.47	1.46	1.68	1.69	1.61	1.57	1.65	1.74	1.93	1.92	1.79	1.65	1.68
1987	1.65	1.78	1.91	1.97	2.05	2.07	2.09	2.10	2.13	2.77	2.96	2.81	2.19
1988	2.82	2.82	2.70	2.76	2.81	2.79	2.82	2.76	2.83	2.70	2.57	2.38	2.73
1989	2.38												
Sorghum, no.2 yellow, Gulf Ports 1/:													
1985	3.70	3.97	4.34	4.52	4.45	4.30	4.28	4.50	4.80	3.90	3.37	2.71	4.07
1986	2.95	3.15	3.26	3.15	3.05	3.09	3.35	3.30	3.51	3.50	3.30	3.04	3.22
1987	3.13	3.35	3.55	3.50	3.65	3.80	3.86	3.70	3.73	5.00	5.33	4.93	3.96
1988	4.99	4.91	4.64	4.93	4.99	4.99	5.02	4.89	5.05	4.75	4.02	4.53	4.81
1989	4.67												
						$/cwt							
Sorghum, no. 2 yellow, Kansas City:													
1985	3.56	3.62	3.75	3.97	3.95	3.80	3.82	4.00	4.25	4.00	3.20	2.71	3.72
1986	2.47	2.60	2.70	2.62	2.50	2.57	2.80	2.85	3.10	3.20	2.80	2.55	2.73
1987	2.64	2.75	2.90	2.95	3.05	3.24	3.27	3.16	3.21	4.58	4.79	4.28	3.40
1988	4.27	4.17	4.00	4.23	4.24	4.26	4.32	4.17	4.29	4.15	3.96	3.92	4.17
1989	2.65												
Sorghum, no. 2 yellow, Texas High Plains:													
1985	4.19	4.38	4.30	4.49	4.47	4.36	4.33	4.48	4.77	4.84	3.93	3.36	4.33
1986	3.35	3.24	2.97	3.06	2.94	2.89	3.06	3.32	3.56	3.60	3.58	3.30	3.24
1987	3.19	3.27	3.27	3.39	3.40	3.53	3.56	3.54	3.55	4.84	5.25	4.96	3.81
1988	4.98	4.95	4.62	4.63	4.75	4.69	4.72	4.63	4.50	4.59	4.46	4.44	4.66
1989	4.39												

Year	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Average
						$/bu.							
Barley, no. 3 or better malting, 65% or better plump, Minneapolis:													
1985	2.46	2.25	2.03	2.15	2.10	2.27	2.29	2.28	2.20	2.34	2.40	2.07	2.24
1986	1.84	1.75	1.61	1.76	1.93	2.02	1.88	1.81	1.92	2.01	2.05	2.12	1.89
1987	2.07	1.93	1.73	1.98	2.08	2.05	2.01	2.02	2.15	2.08	2.11	2.24	2.04
1988	3.61	3.87	4.25	4.40	4.39	4.14	3.82	4.14	4.19	4.33	4.29	3.84	4.11
1989	3.02	3.33	3.57	3.42									
Barley, no. 2 feed, Minneapolis 2/, 3/:													
1985	1.90	1.66	1.46	1.40	1.41	1.49	1.60	1.57	NA	NA	NA	1.31	1.53
1986	1.23	1.16	1.13	1.27	1.50	1.63	1.23	NA	NA	1.64	1.76	1.86	1.44
1987	1.73	1.59	1.60	1.76	1.78	1.82	1.74	1.72	1.77	1.88	1.94	1.98	1.78
1988	2.41	2.31	2.08	2.24	2.32	2.27	2.14	2.24	2.33	2.49	2.52	2.41	2.31
1989	2.12	2.22	2.17	2.14									
Oats, no. 2 heavy white, Minneapolis:													
1985	1.59	1.44	1.23	1.24	1.19	1.32	1.39	1.37	1.30	1.27	1.16	1.22	1.31
1986	1.18	1.05	1.12	1.29	1.39	1.72	1.66	1.64	1.56	1.46	1.59	1.83	1.46
1987	1.64	1.61	1.77	1.85	1.97	2.05	2.02	2.10	2.06	1.93	1.94	2.12	1.92
1988	3.26	3.25	3.09	3.07	2.99	2.71	2.74	2.87	2.59	2.49	2.30	2.22	2.80
1989	2.03	1.72	1.53	1.58									

NA = Not available.
NQ = No quotes.
1/ Rail delivered to Texas Gulf. 2/ Prior to June 1977 reported as barley, no. 3 or better. 3/ Reporting point changed from Minneapolis #2 feed to Duluth #2 feed beginning March 1987. 4/ Preliminary.

Source: Grain and Feed Market News, Agricultural Marketing Service, USDA.

Appendix table 12--Feed-price ratios for livestock, poultry, and milk, by months, 1982-1989

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
Hog/corn, U.S. basis 1/:													
1982	28.5	28.2	24.6	23.7	23.4	21.9	18.6	15.9	15.1	14.4	13.9	13.9	20.2
1983	13.3	12.8	11.8	14.0	15.4	14.6	14.3	14.3	14.1	14.6	15.8	16.2	14.3
1984	16.0	16.5	18.4	19.0	18.2	18.4	16.3	15.3	15.4	16.9	17.6	17.4	17.1
1985	17.3	20.4	19.5	19.8	19.0	18.4	17.6	17.3	19.2	22.7	29.5	35.9	21.4
1986	40.2	37.9	35.9	33.7	32.1	33.9	32.2	33.4	31.9	34.7	37.3	39.9	35.3
1987	36.4	31.3	25.1	23.4	24.3	25.0	22.7	22.3	23.7	19.5	16.2	16.9	23.9
1988	15.7	15.0	14.4	15.7	15.7	15.7	15.2	14.4	16.1	17.9	18.6	20.2	16.2
1989	19.1	21.3											
Beef-steer/corn, Omaha 3/:													
1982	27.5	27.7	25.1	25.2	24.5	23.4	22.7	21.9	21.8	21.2	19.6	18.1	23.2
1983	17.8	18.4	18.3	19.8	21.6	22.1	21.1	20.4	19.7	19.1	20.4	20.7	20.0
1984	21.3	22.4	24.6	25.6	24.8	24.1	22.2	21.5	21.5	21.0	20.4	21.7	22.6
1985	21.8	25.7	27.8	26.7	25.6	24.4	24.0	22.9	23.0	22.3	28.9	36.7	25.8
1986	42.1	42.7	39.7	38.8	40.8	43.9	41.9	42.2	40.2	38.9	41.4	43.9	41.4
1987	42.1	41.4	38.4	36.7	36.4	37.4	38.2	39.4	38.6	29.5	24.4	26.1	35.7
1988	26.4	26.4	28.4	27.9	28.1	28.7	29.4	30.2	29.3	29.1	29.6	32.1	28.8
1989	31.0	2/ 30.8											
Milk/feed, U.S. basis 4/:													
1982	1.57	1.61	1.62	1.60	1.59	1.56	1.55	1.49	1.45	1.43	1.45	1.41	1.53
1983	1.36	1.39	1.36	1.34	1.33	1.33	1.34	1.32	1.32	1.32	1.35	1.40	1.35
1984	1.48	1.56	1.62	1.59	1.57	1.57	1.55	1.51	1.47	1.45	1.44	1.47	1.52
1985	1.51	1.56	1.55	1.53	1.52	1.50	1.48	1.48	1.46	1.45	1.51	1.55	1.51
1986	1.61	1.75	1.77	1.77	1.74	1.69	1.63	1.62	1.58	1.55	1.56	1.60	1.66
1987	1.65	1.65	1.65	1.63	1.52	1.48	1.43	1.40	1.37	1.36	1.15	1.19	1.45
1988	1.25	1.32	1.36	1.37	1.37	1.34	1.30	1.28	1.27	1.28	1.37	1.43	1.33
1989	1.52	1.59											
Egg/feed, U.S. basis 5/:													
1982	6.00	6.30	6.30	6.00	5.70	5.80	6.10	5.80	6.00	5.80	5.70	6.10	6.00
1983	6.00	6.20	6.90	7.70	8.80	8.50	7.40	8.60	6.50	5.80	5.80	5.80	7.00
1984	5.90	5.70	6.50	6.30	5.40	5.60	6.30	5.70	5.50	5.90	5.80	6.50	5.90
1985	7.10	7.30	7.50	7.40	7.20	6.90	7.60	6.40	6.40	5.70	6.90	7.30	7.00
1986	7.30	7.00	8.00	7.90	7.20	7.10	6.60	6.70	6.70	6.10	5.80	5.70	6.84
1987	6.70	6.10	6.60	5.80	5.60	5.30	5.80	5.20	4.90	5.20	4.90	4.90	5.50
1988	5.40	5.30	5.40	5.40	5.90	5.80	7.50	6.20	5.90	6.00	6.10	6.80	5.98
1989	6.80	7.10											
Broiler/feed, U.S. basis 6/:													
1982	2.60	2.50	2.50	2.50	2.60	2.70	2.40	2.30	2.40	2.60	2.80	2.80	2.60
1983	2.70	2.50	2.80	2.90	3.10	3.10	3.10	2.70	2.70	2.70	3.00	2.70	2.80
1984	2.80	2.60	2.80	2.70	2.90	2.90	2.80	2.80	3.10	3.20	3.10	3.10	2.90
1985	3.20	3.10	3.50	3.20	3.20	3.10	3.10	3.10	3.40	3.70	4.50	4.60	3.40
1986	3.80	4.40	3.90	3.50	3.60	3.50	3.30	3.20	3.30	3.00	2.90	3.30	3.48
1987	2.90	2.60	2.70	2.50	2.80	2.60	2.80	3.10	3.70	4.10	3.40	3.40	3.05
1988	3.20	2.80	2.70	2.80	2.90	2.90	3.20	3.20	3.80	3.60	3.30	3.10	3.13
1989	3.10	2.70											
Turkey/feed, U.S. basis 7/:													
1982	3.80	3.90	3.90	3.00	2.90	2.90	2.90	2.70	2.90	3.00	2.80	2.80	3.10
1983	3.00	3.00	3.10	3.50	3.60	3.20	3.30	3.30	3.30	3.30	3.60	3.80	3.30
1984	3.90	4.40	5.00	5.50	4.70	3.80	3.70	3.70	3.70	3.80	4.20	4.50	4.20
1985	5.00	5.50	5.50	5.50	3.40	3.40	3.50	3.80	3.50	4.30	4.50	4.60	4.40
1986	4.70	4.90	4.80	4.00	3.30	3.40	3.60	3.50	3.30	3.30	3.10	2.90	3.73
1987	2.80	2.80	3.10	3.60	2.80	2.60	2.50	2.70	2.80	3.00	3.00	3.10	2.90
1988	3.40	3.60	3.60	2.90	2.70	2.90	3.10	3.30	3.40	3.50	3.30	3.30	3.25
1989	3.00	3.20											

1/ Bushels of corn equal in value to 100 pounds of hog, live weight. 2/ Preliminary. 3/ Based on price of choice beef-steers, 900-1100 pounds. 4/ Pounds of 16-percent mixed dairy feed equal in value to 1 pound whole milk. 5/ Pounds of laying feed equal in value to 1 dozen eggs. 6/ Pounds of broiler grower feed equal in value to 1 pound broiler, live weight. 7/ Pounds of turkey grower feed equal in value to 1 pound of turkey, live weight.

Sources: Agricultural Prices, Agricultural Statistics Board, USDA.
Livestock, Meat & Wool Market News, Agricultural Marketing Service, USDA.

Appendix table 13--Price trends, selected feeds, and corn products .

Item	Unit	Sept.-Aug. 1987/88 1/	1989									
			Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct
Wholesale, mostly bulk 2/:												
Soybean meal, 44% solvent, Decatur	$/ton	214.59	249	234	237	221	215	228	232	216	217	192
Soybean meal, high protein, Decatur	"	231.95	270	252	254	238	232	246	251	234	235	208
Cottonseed meal, 41% solvent, Memphis	"	173.20	201	191	196	184	162	163	168	172	190	181
Linseed meal, 34% solvent, Minneapolis	"	153.58	164	151	150	155	156	163	159	161	145	129
Meat and bone meal, Kansas City	"	250.36	275	261	266	254	229	258	267	218	231	226
Fishmeal, 67% protein, East Coast	"	453.78	464	437	428	413	395	384	397	397	383	381
Corn gluten feed, Illinois pts.	"	115.68	127	121	119	120	113	108	107	106	108	110
Corn gluten feed, 60% protein, Illinois pts.	"	303.11	281	288	281	276	272	271	271	257	267	313
Brewers' dried grains, Milwaukee	"	106.55	146	141	126	122	114	110	108	106	99	103
Distillers' dried grains, Lawrenceburg, Indiana	"	131.63	138	138	140	146	144	140	134	NQ	142	140
Feather meal, Arkansas pts.	"	242.98	298	283	285	260	213	216	243	203	225	227
Wheat bran, Kansas City	"	73.47	94	107	102	83	78	61	58	67	74	93
Wheat middlings, Kansas City	"	73.47	94	107	102	83	78	61	58	67	74	93
Rice bran, f.o.b. mills, Arkansas	"	57.89	75	57	74	62	56	57	57	63	65	63
Hominy feed, Illinois pts.	"	81.58	98	91	94	97	89	84	82	83	89	91
Alfalfa meal, dehydrated, Kansas City	"	107.67	139	138	141	146	149	134	129	125	124	125
Cane molasses, New Orleans	"	57.77	67	66	58	58	56	56	55	51	50	51
Molasses beet pulp, Los Angeles	"	100.83	127	129	133	125	125	70	77	68	65	66
Animal fat, Kansas City	c/lb.	11.79	12.50	12.00	12.00	12.00	11.40	10.90	10.80	9.30	10.00	10.30
Urea, 42% nitrogen, Forth Worth	$/ton	225.00	225	212	189	190	190	190	190	190	190	190
Corn, no. 2 white, Kansas City	$/bu.	2.55	4	4	4	4	4	4	3	3	3	3
Prices paid, U.S. basis 3/ 4/:												
Soybean meal, 44%	$/cwt	19.32	17	---	---	16	---	---	16	---	---	15
Cottonseed meal, 41%	"	18.64	16	---	---	16	---	---	15	---	---	15
Wheat bran	"	12.31	11	---	---	11	---	---	11	---	---	11
Wheat middlings	"	11.03	10	---	---	10	---	---	9	---	---	9
Broiler grower feed	$/ton	268.08	246	---	---	240	---	---	236	---	---	223
Laying feed	"	248.39	215	---	---	211	---	---	209	---	---	200
Turkey grower feed	"	303.84	260	---	---	250	---	---	251	---	---	243
Chick starter	"	275.3	244	---	---	242	---	---	243	---	---	230
Dairy feed, 16%	"	225.42	196	---	---	192	---	---	184	---	---	182
Beef cattle concentrate, 32-36% protein 5/	$/cwt	316.97	273	---	---	271	---	---	263	---	---	263
Hog concentrate, 38-42% protein 5/	"	426.23	362	---	---	344	---	---	346	---	---	327
Stock salt 5/	"	4.29	3	---	---	3	---	---	3	---	---	3
Corn products, wholesale 6/:												
Corn meal, yellow, New York	$/cwt	11.88	13.13	13.00	13.28	13.11	13.15	13.21	13.28	12.91	12.88	13.03
Grits (brewers'), Chicago	"	8.84	10.03	9.87	10.04	9.89	10.49	10.02	10.09	9.76	9.84	9.99
Syrup, Midwest/West	c/lb.	8.42	10.87	10.41	10.15	10.46	10.46	11.96	11.96	11.96	11.36	10.46
Sugar (dextrose), Midwest	"	22.43	24.50	24.50	24.60	25.00	25.00	25.00	25.00	25.00	25.00	24.50
High-fructose (dried weight in tank cars), Midwest	"	11.42	11.50	11.50	12.27	13.90	14.38	15.15	15.58	16.29	15.52	12.46
Corn starch, f.o b. Midwest	$/cwt	10.71	10.00	10.25	10.25	10.00	10.25	10.70	10.70	10.70	10.40	10.40

--- = Not applicable.
NA = Not available.
1/ Preliminary. 2/ Grain and Feed Market News, Agricultural Marketing Service, USDA, except urea which is from Feedstuffs, Miller Publishing Co., Minneapolis, Minnesota. 3/ Agricultural Prices, Agricultural Statistics Board, USDA. 4/ Prices paid data is available on a quarterly basis only. 5/ Prices previously published in cwt. 6/ Milling and Baking News, Kansas City, Missouri, except starch which is from industry sources.

Appendix table 14--Corn, sorghum, barley, and oats exports, 1986/87 to date 1/

Year and month	Corn		Sorghum	Year and month	Barley		Oats	
	Grain only	Total			Grain only	Total	Grain only	Total
	Bushels				Bushels			
1986/87:				1986/87:				
Sept.	80,082,655	81,263,962	14,227,263	June	2,000	276,815	79,108	128,492
Oct.	124,025,138	124,843,757	18,547,828	July	1,164,620	1,597,139	81,504	217,421
Nov.	114,104,314	114,952,811	14,680,456	Aug.	12,319,164	12,514,711	73,364	335,437
1st Qtr.	318,212,107	321,060,530	47,455,547	1st Qtr.	13,485,784	14,388,665	233,976	681,350
Dec.	109,759,488	110,685,062	19,954,747	Sept.	12,772,707	12,912,177	121,288	327,625
Jan.	104,283,400	105,274,114	15,484,239	Oct.	16,480,986	16,559,353	167,403	411,976
Feb.	98,787,906	99,445,787	20,749,712	Nov.	14,292,746	14,363,851	32,293	167,870
2nd Qtr.	312,830,794	315,404,963	56,188,698	2nd Qtr.	43,546,439	43,835,381	320,984	907,471
Mar.	143,717,211	145,375,500	24,415,530	Dec.	14,532,134	14,661,828	17,314	315,049
Apr.	183,288,269	184,280,573	12,956,519	Jan.	1,205,709	1,262,335	30,960	75,145
May	169,091,351	170,576,405	13,788,332	Feb.	16,084,544	16,522,282	30,776	178,452
3rd Qtr.	496,096,831	500,232,478	51,160,381	3rd Qtr.	31,822,387	32,446,445	79,050	568,646
June	120,026,244	120,818,241	12,940,287	Mar.	17,639,725	18,150,611	115,234	277,846
July	133,984,531	134,900,706	22,883,734	Apr.	16,599,968	17,153,570	105,251	191,418
Aug.	111,320,100	112,008,863	7,698,710	May	10,522,937	10,726,481	67,436	168,607
4th Qtr.	365,330,875	367,727,810	43,522,731	4th Qtr.	44,762,630	46,030,662	287,921	637,871
Total	1,492,470,607	1,504,425,781	198,327,357	Total	133,617,240	136,701,153	921,931	2,795,338
1987/88:				1987/88:				
Sept.	135,403,937	136,130,948	17,832,858	June	517,681	754,738	104,217	187,886
Oct.	137,693,604	138,785,098	16,734,001	July	7,421,463	7,675,576	50,113	92,430
Nov.	122,468,369	123,086,306	10,296,951	Aug.	8,813,825	9,257,652	18,135	153,171
1st Qtr.	395,565,910	398,002,352	44,863,810	1st Qtr.	16,752,969	17,687,966	172,465	433,487
Dec.	148,189,862	149,286,585	21,462,657	Sept.	10,014,514	10,217,330	24,184	62,343
Jan.	133,442,601	134,301,735	19,428,923	Oct.	16,474,137	17,009,495	62,220	144,789
Feb.	123,706,547	124,687,685	22,498,453	Nov.	17,914,754	18,114,982	38,617	99,130
2nd Qtr.	405,339,010	408,276,004	63,390,033	2nd Qtr.	44,403,405	45,341,807	125,021	306,262
Mar.	164,120,347	165,290,216	24,662,618	Dec.	15,583,102	16,123,445	5,680	36,703
Apr.	166,544,265	167,301,461	30,340,887	Jan.	9,595,582	9,832,999	96,376	147,370
May	180,228,794	181,240,672	22,103,010	Feb.	6,764,525	7,239,965	29,937	148,578
3rd Qtr.	510,893,406	513,832,349	77,106,515	3rd Qtr.	31,943,209	33,196,409	131,993	332,651
June	132,984,257	133,834,129	13,740,797	Mar.	15,349,596	15,756,272	24,173	49,618
July	125,143,728	126,481,200	20,243,604	Apr.	8,796,666	9,029,851	12,420	114,674
Aug.	153,230,968	154,112,459	11,996,893	May	4,470,071	4,979,881	22,950	215,233
4th Qtr.	411,358,953	414,427,788	45,981,294	4th Qtr.	28,616,333	29,766,004	59,543	379,525
Total	1,723,157,278	1,734,538,492	231,341,652	Total	121,715,916	125,992,186	489,022	1,451,925
1988/89:				1988/89:				
Sept.	154,515,167	155,407,609	27,007,863	June	12,108,210	12,402,962	102,245	258,289
Oct.	174,032,976	175,250,327	19,499,969	July	11,513,586	11,757,762	38,739	88,239
Nov.	149,832,944	151,230,592	18,305,771	Aug.	2,214,904	2,500,232	24,394	145,962
1st Qtr.	478,381,088	481,888,528	64,813,603	1st Qtr.	25,836,700	26,660,955	165,378	492,490
Dec.	172,593,812	173,646,874	27,308,107	Sept.	8,758,198	8,833,519	21,017	90,049
Jan.	175,221,513	176,487,573	32,501,841	Oct.	1,513,507	2,242,594	30,378	57,096
Feb.	154,909,994	158,177,973	33,002,703	Nov.	2,625,600	3,228,822	73,371	126,759
2nd Qtr.	502,725,319	508,312,420	92,812,651	2nd Qtr.	12,897,305	14,304,935	124,766	273,904
Mar.	202,840,169	206,563,860	30,648,140	Dec.	15,121,435	15,440,102	29,605	51,848
Apr.	177,475,933	180,898,856	28,248,011	Jan.	84,517	417,785	115,957	154,015
May	211,303,127	212,764,901	21,239,060	Feb.	81,490	439,958	65,245	112,585
3rd Qtr.	591,619,229	600,227,617	80,135,211	3rd Qtr.	15,287,442	16,297,846	210,807	318,448
June	223,487,607	225,359,132	24,105,107	Mar.	1,964,297	2,424,381	22,487	70,294
July	133,145,813	135,157,047	25,119,434	Apr.	13,817,421	14,373,832	27,765	69,774
Aug.	106,804,440	109,287,340	22,869,115	May	9,781,368	10,571,462	27,121	60,581
4th Qtr.	463,437,860	469,803,519	72,093,656	4th Qtr.	25,563,086	27,369,674	77,373	200,649
Total	2,036,163,496	2,060,232,084	309,855,121	Total	79,584,533	84,633,410	578,324	1,285,491
1989/90:				1989/90:				
Sept.	113,776,974	116,262,446	37,711,379	June	7,412,020	8,169,340	73,555	134,619
Oct.				July	9,666,205	10,690,552	99,550	154,363
Nov.				Aug.	9,513,210	9,985,797	60,059	185,406
1st Qtr.	113,776,974	116,262,446	37,711,379	1st Qtr.	26,591,435	28,845,689	233,164	474,388
				Sept.	8,060,139	9,274,483	137,368	245,862

1/ Total corn exports include grain only (white, yellow, seed, relief), dry process (cornmeal for relief, as grain, grits), and wet process (corn starch, sugar dextrose, glucose, high fructose). Sorghum includes seed and unmilled. Barley includes grain only (grain for malting purposes, other) and barley malt. Oats include grain and oatmeal (bulk and packaged).

Source: Bureau of the Census, U.S. Department of Commerce.

Appendix table 15--Corn, sorghum, barley, and oats imports, 1986/87 to date 1/

Year and month	Corn		Sorghum	Year and month	Barley		Oats	
	Grain only	Total			Grain only	Total	Grain only	Total
	Bushels				Bushels			
1986/87:				1986/87:				
Sept.	311,213	332,783	6,329	June	1,296,495	1,501,548	5,325,371	5,345,316
Oct.	66,792	107,949	0	July	15,140	223,046	1,841,943	1,868,602
Nov.	333,201	353,750	33	Aug.	19,469	210,558	1,537,423	1,559,704
1st Qtr.	711,206	794,482	6,362	1st Qtr.	1,331,104	1,935,152	8,704,737	8,773,622
Dec.	66,353	131,009	0	Sept.	75,927	307,474	846,095	879,869
Jan.	85,979	134,935	0	Oct.	31,578	207,980	1,262,426	1,292,827
Feb.	14,207	52,622	86	Nov.	926,059	1,193,914	2,695,161	3,342,153
2nd Qtr.	166,539	318,566	86	2nd Qtr.	1,033,564	1,709,368	4,803,682	5,514,849
Mar.	29,812	63,602	0	Dec.	173,536	310,750	1,241,736	1,261,139
Apr.	400,056	428,391	0	Jan.	392,962	681,307	3,981,067	4,020,146
May	19,009	30,652	0	Feb.	625,953	772,737	3,994,932	4,027,553
3rd Qtr.	448,877	522,645	0	3rd Qtr.	1,192,451	1,764,794	9,217,735	9,308,838
June	326,401	339,131	0	Mar.	1,808,103	1,888,079	2,277,619	2,300,061
July	32,223	48,591	197	Apr.	508,133	591,606	3,401,071	3,434,844
Aug.	71,486	471,582	0	May	792,379	849,842	3,951,545	3,988,454
4th Qtr.	430,110	471,582	197	4th Qtr.	3,108,615	3,329,527	9,630,235	9,723,359
Total	1,756,732	2,107,275	6,645	Total	6,665,734	8,738,841	32,356,389	33,320,668
1987/88:				1987/88:				
Sept.	130,361	151,725	0	June	683,655	895,759	3,730,421	3,760,272
Oct.	354,333	373,790	24	July	195,998	448,601	1,717,932	1,735,424
Nov.	77,145	101,481	15	Aug.	220,222	434,668	1,541,932	1,582,741
1st Qtr.	561,839	626,997	39	1st Qtr.	1,099,875	1,779,029	6,990,285	7,078,437
Dec.	246,126	298,521	0	Sept.	1,061,243	1,396,496	1,712,779	1,744,204
Jan.	126,012	167,032	0	Oct.	926,329	1,222,581	1,270,484	1,372,822
Feb.	332,569	388,773	19	Nov.	876,498	1,209,707	5,106,952	5,148,944
2nd Qtr.	704,707	854,325	19	2nd Qtr.	2,864,070	3,828,784	8,090,215	8,265,970
Mar.	593,592	683,203	12	Dec.	1,146,248	1,384,778	2,537,116	2,566,987
Apr.	662,637	739,543	30	Jan.	1,846,528	2,038,574	4,086,315	4,154,507
May	113,606	140,762	0	Feb.	1,318,218	1,605,421	9,167,026	9,213,156
3rd Qtr.	1,369,835	1,563,509	62	3rd Qtr.	4,310,994	5,028,773	15,790,457	15,934,651
June	347,181	376,601	0	Mar.	1,163,560	1,280,709	6,426,933	6,482,646
July	257,479	275,042	0	Apr.	986,537	1,063,805	3,701,098	3,737,802
Aug.	169,701	207,314	7,229	May	876,452	961,089	4,721,106	4,756,988
4th Qtr.	774,361	858,958	7,229	4th Qtr.	3,026,549	3,305,603	14,849,137	14,977,436
Total	3,410,742	3,903,789	7,350	Total	11,301,488	13,942,189	45,720,094	46,256,494
1988/89:				1988/89:				
Sept.	148,437	177,913	0	June	1,596,106	1,700,185	5,680,015	5,772,502
Oct.	296,701	308,058	3,673	July	930,207	1,029,127	2,276,583	2,365,501
Nov.	180,789	233,514	0	Aug.	317,223	417,363	4,298,356	4,485,006
1st Qtr.	625,927	719,485	3,673	1st Qtr.	2,843,536	3,146,676	12,254,954	12,623,008
Dec.	106,151	173,241	0	Sept.	240,729	365,319	2,059,442	2,367,645
Jan.	307,023	723,699	0	Oct.	402,245	555,196	3,995,388	4,239,340
Feb.	178,260	591,385	15,130	Nov.	1,523,621	1,651,752	5,834,991	6,184,617
2nd Qtr.	591,434	1,488,325	15,130	2nd Qtr.	2,166,595	2,572,267	11,889,821	12,791,602
Mar.	420,381	742,935	0	Dec.	490,420	578,085	4,696,591	5,153,441
Apr.	633,060	845,387	5	Jan.	729,443	838,489	6,100,483	6,906,243
May	162,021	356,329	0	Feb.	1,627,551	1,720,819	9,313,487	10,172,629
3rd Qtr.	1,215,462	1,944,651	5	3rd Qtr.	2,847,414	3,137,394	20,110,561	22,232,313
June	33,363	212,637	14	Mar.	762,924	851,359	7,169,256	8,042,377
July	223,459	382,968	0	Apr.	753,742	857,654	4,750,564	5,431,135
Aug.	93,469	348,056	0	May	1,136,714	1,239,385	6,723,912	7,307,316
4th Qtr.	350,291	943,661	14	4th Qtr.	2,653,380	2,948,399	18,643,732	20,780,828
Total	2,783,114	5,096,122	18,822	Total	10,510,925	11,804,736	62,899,069	68,427,752
1989/90:				1989/90:				
Sept.	38,078	278,865	0	June	1,649,125	1,745,195	3,146,832	3,791,155
Oct.				July	571,185	661,468	6,440,929	6,730,677
Nov.				Aug.	1,356,499	1,456,086	7,372,277	7,823,880
1st Qtr.	38,078	278,865	0	1st Qtr.	3,576,809	3,862,749	16,960,038	18,345,712
				Sept.	263,515	360,996	5,871,691	6,236,194

1/ Corn includes grain only (yellow dent corn, other), seed, and cornmeal. Sorghum is grain only. Barley includes grain only barley for malting, other), pearl barley, milled and malting. Oats include grain (hulled or unhulled), unhull oats fit and unfit for human consumption, and oatmeal fit for human consumption.

Source: Bureau of the Census, U.S. Department of Commerce.

Appendix table 16--Shipments of grain on the Illinois Waterway and the Mississi

Crop year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
						Million to
1981/82	3.4	3.4	4.6	3.9	1.2	0.8
1982/83	4.1	3.2	4.2	3.2	2.7	2.3
1983/84	5.3	4.9	5.7	4.4	1.0	3.6
1984/85	3.1	4.6	5.5	3.1	2.0	0.9
1985/86	2.4	2.6	4.3	3.3	1.8	1.7
1986/87	3.2	3.1	5.2	2.4	1.2	1.7
1987/88	3.3	3.8	3.9	2.9	1.9	2.0
1988/89	3.3	3.3	3.9	3.5	1.7	1.5
1989/90	3.0	3.9				

Source: Mississippi River Barge Traffic, U.S. Army Corps of Engineers, Rock I

Appendix table 17--Barge rates for grain shipments to New Orleans, Louisiana 1/

Crop year	Origin	Sept.	Oct.	Nov.	Dec.	Jan.
1984/85	Peoria, IL	7.77	8.07	6.71	5.79	7.34
	St Louis, MO	5.94	5.92	5.15	3.98	4.36
1985/86	Peoria, IL	5.26	7.93	6.48	9.08	7.22
	St Louis, MO	4.32	6.42	4.80	5.35	4.39
1986/87	Peoria, IL	8.37	10.54	6.64	5.16	4.95
	St Louis, MO	6.52	7.52	5.06	3.62	3.28
1987/88	Peoria, IL	8.66	9.04	7.38	5.68	7.32
	St Louis, MO	6.58	6.97	5.73	4.29	4.39
1988/89	Peoria, IL	9.80	10.32	7.88	8.81	7.32
	St Louis, MO	7.91	8.35	5.94	6.11	5.19
1989/90	Peoria, IL	5.89	10.49			
	St Louis, MO	4.64	7.90			

1/ Assumes all traffic on the Illinois River originates at Peoria, IL.

Source: Based on rates reported by Transportation Situation, Illinois Dept. o

ssissippi River (Locks 11-22), 1981/82-1988/89

Feb.	Mar.	Apr.	May	June	July	Aug.	Average
ion tons							
0.8	2.1	4.1	3.8	4.4	3.9	5.0	3.4
2.3	3.8	3.3	3.9	4.2	4.2	4.8	3.6
3.6	4.5	5.3	4.4	3.7	3.4	3.3	4.1
0.9	3.1	4.1	3.1	3.2	3.4	3.0	3.3
1.7	2.9	3.4	3.6	3.2	2.5	3.3	2.9
1.7	3.6	3.8	4.0	3.8	2.8	3.5	3.2
2.0	3.0	4.2	4.3	3.6	2.7	3.3	3.2
1.5	2.6	3.5	4.3	4.1	3.9	3.4	3.3
							3.5

Rock Island District.

ana 1/

.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
	--Dollars per ton--							
4	6.87	5.73	5.08	4.33	4.76	4.83	4.63	5.99
6	4.20	3.88	3.79	3.29	3.39	3.34	3.64	4.24
2	5.64	4.28	4.13	3.90	3.70	3.70	6.21	5.63
9	3.87	3.18	3.14	2.97	2.99	2.96	4.62	4.08
5	5.23	6.96	5.88	5.44	6.16	6.15	6.46	6.50
8	3.52	5.27	4.54	3.77	4.30	4.37	4.99	4.73
2	6.89	8.16	7.25	6.19	9.86	9.79	7.61	7.82
9	4.59	6.13	5.47	4.65	7.56	6.81	6.46	5.80
2	7.26	7.08	5.85	5.34	6.13	4.92	5.13	7.15
9	5.31	5.40	4.18	3.72	4.44	3.68	3.92	5.35
								8.19
								6.27

Dept. of Agriculture.

Appendix table 18--Weekly average of rail car loadings of grain and soybeans, 1979/80

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar
						Carloads	
1979/80	28,576	32,118	32,558	30,500	30,504	31,025	30,1
1980/81	32,127	24,114	31,450	28,106	34,396	31,108	27,6
1981/82	25,607	25,609	27,419	22,384	22,967	27,220	26,8
1982/83	20,321	29,523	25,350	21,888	24,700	26,318	26,8
1983/84	29,735	31,414	29,515	25,927	31,068	29,105	27,6
1984/85	29,162	24,482	28,587	25,441	25,310	23,688	23,3
1985/86	18,889	26,227	28,214	23,482	25,424	22,558	20,6
1986/87	27,329	33,605	29,877	24,827	23,086	26,663	27,1
1987/88	32,977	32,820	29,947	29,225	32,223	34,224	34,2
1988/89	29,014	30,628	27,143	27,384	30,178	29,890	31,5
1989/90	24,364	28,894					

Source: Association of American Railroads.

Appendix table 19--Rail freight rate index for grain, crop years 1979/80-1988/89 (December 1984=100)

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Ma
1979/80	64.2	69.5	69.6	70.2	70.2	71.4	7
1980/81	78.3	78.8	78.8	79.2	83.1	84.1	8
1981/82	88.5	89.4	89.4	89.4	93.6	93.6	9
1982/83	93.0	93.0	93.0	93.0	93.9	93.9	9
1983/84	93.9	94.2	94.2	94.2	98.0	98.0	9
1984/85	98.4	100.0	100.0	100.0	100.0	100.0	9
1985/86	98.0	98.0	98.0	98.0	98.9	99.0	9
1986/87	99.2	98.5	98.5	97.8	98.3	98.3	9
1987/88	98.9	99.2	99.1	98.5	101.2	101.2	10
1988/89	109.3	108.3	108.5	108.2	109.2	109.2	10
1989/90	108.4	108.4					

Source: Bureau of Labor Statistics, U.S. Dept. of Labor.

1979/80-1988/89

Mar.	Apr.	May	June	July	Aug.	Average
30,170	26,546	23,606	28,333	32,584	32,921	29,953
27,657	23,490	21,291	28,014	22,162	26,152	27,506
26,813	25,798	23,755	22,540	27,020	25,123	25,188
26,807	21,243	20,849	21,393	27,942	27,461	24,483
27,666	26,784	23,616	24,335	26,632	29,848	27,970
23,340	20,164	17,715	24,724	22,662	20,218	23,791
20,648	17,743	17,673	24,907	24,426	24,342	22,878
27,134	25,046	26,189	32,154	32,257	30,825	28,249
34,241	32,963	30,861	33,316	29,678	27,010	31,624
31,766	30,144	25,942	27,305	25,055	25,905	28,363
						26,629

/89

Mar.	Apr.	May	June	July	Aug.	Average
70.5	72.7	72.8	73.3	76.6	76.9	71.5
85.0	84.8	84.8	85.7	88.0	88.5	83.3
93.6	93.6	93.6	93.6	93.6	93.6	92.1
93.9	93.9	93.9	93.9	93.9	93.9	93.6
98.0	98.0	98.0	98.0	98.4	98.4	96.8
99.3	99.3	98.7	97.3	96.4	96.3	98.8
99.0	99.1	99.2	99.2	99.2	99.2	98.7
98.8	98.6	98.5	98.6	98.6	98.5	98.5
101.4	102.7	104.1	104.3	106.4	109.3	102.2
108.8	108.8	108.8	108.0	108.5	108.4	108.7
						108.4

Appendix table 20--Hay (all): Acreage, supply, and disappearance, 1983/84-1989/90

Item	Unit	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
Acreage harvested	Mil. acres	59.7	61.4	60.4	62.4	60.7	65.6	62.7
Yield per acre	Tons	2.36	2.45	2.46	2.49	2.46	1.93	2.40
Carryover (May 1)	Mil. tons	28.1	20.1	26.9	26.7	32.4	27.4	17.6
Production	"	140.8	150.6	148.6	155.5	149.3	126.8	150.5
Supply	"	168.9	170.7	175.5	182.2	181.7	154.2	168.1
Disappearance	"	148.8	143.8	148.8	149.8	154.4	136.5	NA
Roughage-consuming animal units (RCAU's)	Mil. units	86.9	83.2	80.7	78.3	76.4	76.6	77.4
Supply per RCAU	Tons	1.94	2.05	2.18	2.33	2.38	2.01	2.17
Disappearance per RCAU	"	1.71	1.73	1.84	1.91	2.02	1.78	NA

NA = Not available.

Appendix table 21--Hay: Average prices received by farmers, United States by months, 1983/84-1989/90 1/

Year	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Average 2/
							$/ton						
Alfalfa:													
1983/84	83.80	78.30	77.40	77.40	79.10	82.40	80.10	81.70	82.00	85.10	84.40	84.30	81.33
1984/85	87.10	80.10	75.60	72.80	73.90	76.70	74.30	77.50	76.20	76.40	75.80	76.70	76.93
1985/86	85.50	74.90	72.50	68.10	70.70	70.50	67.70	69.10	70.20	71.30	72.00	69.80	71.86
1986/87	69.50	64.10	61.40	60.10	58.80	59.90	57.90	60.70	58.80	61.10	62.80	67.90	61.92
1987/88	77.70	67.40	65.70	64.60	69.30	68.00	64.60	68.80	66.50	69.60	72.50	76.90	69.31
1988/89	85.50	82.70	88.10	86.70	89.40	92.00	92.80	96.40	98.30	101.00	106.00	110.00	94.08
1989/90	108.00	101.00	91.40	88.00	90.50	3/92.20							
Other hay:													
1983/84	58.90	56.10	54.30	52.90	57.80	59.50	62.10	64.30	63.30	63.80	64.90	66.50	60.37
1984/85	64.90	63.40	61.80	60.90	62.40	62.00	62.60	64.80	64.70	61.70	58.40	62.40	62.50
1985/86	58.70	54.00	57.00	58.40	58.60	58.20	55.30	56.00	56.10	56.00	54.80	54.90	56.50
1986/87	54.00	50.90	50.00	51.00	52.70	50.00	49.70	49.40	48.10	50.90	48.30	48.20	50.27
1987/88	51.00	49.60	50.00	52.20	52.40	53.00	53.60	53.30	52.20	51.50	51.70	51.90	52.09
1988/89	57.50	61.60	66.60	68.70	70.60	69.80	72.30	72.50	74.00	74.40	75.70	77.50	70.10
1989/90	77.20	68.30	65.40	67.10	65.50	3/64.30							
All hay:													
1983/84	78.10	72.70	71.20	71.20	74.70	76.80	75.10	76.70	76.60	78.70	79.40	79.80	75.80
1984/85	82.50	76.10	72.40	70.40	70.70	73.10	71.40	73.40	73.00	73.10	72.20	72.50	72.70
1985/86	80.80	70.20	67.90	65.20	67.10	67.50	64.30	65.40	65.80	66.70	67.10	66.20	67.60
1986/87	66.70	61.00	58.80	58.20	57.60	57.90	56.00	57.70	56.10	58.50	59.20	64.10	59.70
1987/88	71.70	62.90	61.20	62.70	64.10	64.20	61.10	63.20	62.80	64.60	67.20	71.40	65.10
1988/89	81.10	77.40	82.30	82.10	85.10	86.80	87.60	89.60	91.20	93.70	98.10	104.00	87.10
1989/90	104.00	94.80	85.40	82.80	85.00	3/85.70							

1/ Prices reported for mid-month. 2/ U.S. season average prices weighted by monthly marketings. 3/ Preliminary.

Source: Agricultural Prices, Agricultural Statistics Board, USDA.

Appendix table 22--Processed feeds: Quantity fed, 1981-1989 1/ 2/

	1981	1982	1983
High protein:			
Oilseed meal--			
Soybean 4/	16,070	17,514	15,980
Cottonseed	1,848	1,495	1,022
Linseed	70	94	112
Peanut	107	67	68
Sunflower	200	433	240
Canola	29	53	99
Total	18,324	19,656	17,521
Animal proteins--			
Tankage and meat meal	2,261	2,133	2,102
Fishmeal and solubles	480	412	453
Milk products	303	361	368
Total	3,044	2,906	2,923
Grain protein feeds--			
Gluten feed and meal	904	757	1,281
Brewers' dried grains	239	195	135
Distillers' dried grains	448	682	564
Total	1,591	1,634	1,980
Other:			
Wheat millfeeds	4,848	5,139	5,078
Rice millfeeds	513	434	461
Dried and molasses beetpulp	934	519	536
Alfalfa meal	899	887	898
Fats and oils	629	659	670
Molasses, inedible	1694	2322	2070
Miscellaneous byproduct feeds 5/	1,270	1,270	1,267
Total	10,787	11,230	10,980
Grand total	33,746	35,426	33,404

1/ Year beginning October. 2/ Adjusted for stocks, productions, foreign t
4/ Includes use in edible soy products and shipments to U.S. territories. 5/

	1984	1985	1986	1987	1988	1989 /3
	---- 1,000 metric tons ----					
,980	17,672	17,318	18,495	19,317	17,983	19,299
,022	1,595	1,379	1,026	1,442	1,467	1,298
112	106	105	119	116	96	103
68	111	161	94	112	165	170
240	307	313	269	381	299	260
99	145	121	206	206	279	270
,521	19,936	19,397	20,209	21,574	20,289	21,400
,102	2,523	2,540	2,395	2,457	2,340	2,470
453	589	464	471	345	205	350
368	386	373	396	399	395	400
,923	3,498	3,377	3,262	3,201	2,940	3,220
,281	1,876	1,055	1,165	1,484	1,213	1,249
135	142	135	146	120	114	125
564	807	873	805	1,035	830	850
,980	2,825	2,063	2,116	2,639	2,157	2,224
,078	5,084	5,278	5,715	5,652	5,652	5,767
461	456	503	610	551	615	600
536	728	701	645	699	625	700
898	808	777	589	554	410	400
670	672	765	832	826	944	950
2070	2407	1887	1771	1598	1593	1600
,267	1,267	1,267	1,267	1,267	1,267	1,267
,980	11,422	11,178	11,429	11,147	11,106	11,284
,404	37,681	36,015	37,016	38,561	36,492	38,128

reign trade, and nonfeed uses where applicable. 3/ Forecast.
ies. 5/ Allowance for hominy feed, oat millfeeds, and screenings.

Appendix table 23--Feed Concentrates, number of animal units, and feed per unit, 1981-198

	1981	1982	1983	1984
				Million me
Concentrates:				
Corn	105.9	114.8	97.0	103.6
Sorghum	10.6	12.6	9.8	13.7
Oats	6.6	6.4	6.8	6.3
Barley	4.3	5.2	6.2	6.6
Wheat and rye	3.9	5.5	10.3	11.4
Oilseed meals	18.3	19.7	17.5	19.9
Animal protein feeds	3.0	2.9	2.9	3.5
Grain protein feeds	1.6	1.6	2.0	2.8
Other byproduct feeds	10.8	11.2	11.0	11.4
Total	165.0	179.9	163.5	179.2
Grain-consuming animal units (GCAU's):				Mi
Dairy cattle	12.2	12.4	12.4	12.2
Cattle on feed	16.3	18.5	17.8	19.1
Other cattle	4.9	4.8	4.7	4.5
Hogs	20.3	20.5	20.4	19.8
Poultry	18.6	18.3	18.6	19.0
Other livestock	0.7	0.7	0.7	0.7
Total	73.0	75.2	74.6	75.2
Concentrates GCAU				T
Four feed grains	1.74	1.85	1.61	1.73
All concentrates	2.26	2.39	2.19	2.38

1/ Marketing years, 1989/90 forecast.

* U.S. GOVERNMENT PRINTING OFFICE:1989-261-420:20114/ERS

1981-1989 1/

1984	1985	1986	1987	1988	1989
llion metric tons					
103.6	104.0	119.7	120.3	100.3	106.7
13.7	16.9	13.6	14.3	11.9	12.7
6.3	6.7	5.7	5.2	2.9	4.4
6.6	7.2	6.5	5.6	3.6	4.1
11.4	7.9	11.5	7.9	4.2	5.7
19.9	19.4	20.2	21.6	20.3	21.4
3.5	3.4	3.3	3.2	2.9	3.2
2.8	2.1	2.1	2.6	2.2	2.2
11.4	11.2	11.4	11.1	11.1	11.3
179.2	178.8	194.1	191.9	159.5	171.7
	Million units				
12.2	12.5	11.8	11.5	11.4	11.3
19.1	17.6	16.8	17.7	17.1	16.2
4.5	4.3	4.2	4.0	4.0	4.1
19.8	19.3	19.4	20.8	21.2	21.6
19.0	19.7	21.0	21.4	22.0	23.1
0.7	0.7	0.7	0.7	0.7	0.7
75.2	74.1	73.8	76.1	76.5	77.1
	Tons per unit				
1.73	1.82	1.97	1.91	1.55	1.66
2.38	2.41	2.63	2.52	2.09	2.23

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1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5